Draft Environmental Impact Statement for the Realignment of E-2 Squadrons from Naval Air Station (NAS) Miramar

Volume II

US Department of Defense
Department of the Navy

November 1997

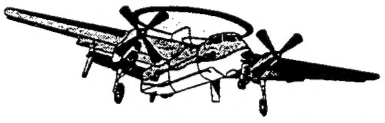
TABLE OF CONTENTS

Appendix Page

VOLUME II

TABLE OF CONTENTS *(continued)*

Appendix



Appendix A. Public Involvement

APPENDIX A
PUBLIC INVOLVEMENT

As discussed in Section 1.5, Public Involvement Process of this document, the NEPA process is designed to involve the public in the decision-making process. This appendix contains copies of the public involvement materials used to inform federal, state, and local agencies, elected officials, organizations, and individuals about the preparation of this document.

A scoping letter and project summary was distributed to announce the Navy's intent to prepare this EIS, the start of the public scoping period, the dates and locations of the public scoping meetings, and the address and deadline to provide scoping comments (Section A.2). A notice of intent (NOI) was published in the Federal Register on May 1, 1996 (Volume 61, Number 85). A copy of the NOI is provided in Section A.3. The NOI was published in nine local newspapers—Hanford Sentinel, Lemoore Advance, Fresno Bee, Imperial Valley Press, San Diego Union Tribune, Eagle (Coronado), Coronado Journal, Ventura County Star, and the Los Angeles Times, Ventura County Edition. A sample newspaper advertisement and the dates of publication are provided in Section A.4.

A.1 SUMMARY OF SCOPING COMMENTS

Written and verbal comments received during the EIS scoping process, which ended on June 6, 1996, are summarized below for the three proposed alternative sites. Verbal comments were received during four scoping meetings held in the City of Oxnard on May 21, 1996, the City of El Centro on May 23, 1996, the City of Coronado on May 28, 1996, and the City of Lemoore on May 29, 1996.

A.1.1 Preferred Alternative: NAWS Point Mugu (City of Oxnard)

Specific environmental issues or concerns related to the EIS and the sections in which they are addressed are summarized in Table A-1.

Table A-1
Summary of Scoping Comments for NAWS Point Mugu

Comment	Addressed in Section(s)
Comments requested that the EIS address the compatibility of the proposed action with the California Coastal Zone and with the Joint Use Proposal of the Federal Aviation Administration to turn Point Mugu into a commercial airport.	*Section 4.3, Land Use and Airspace*
Comments requested that the EIS consider the effects on private sector investment in the area, including the effects on the local employment base and job opportunities. Concerns were expressed that spouses of proposed action employees and Navy personnel would take jobs that would otherwise go to local residents. Additional statements, pro and con, gave opinions on the net effect of the proposed action on the local economy. Concern was voiced about the noise effects on sports fishing and boating off the coast in the Point Mugu vicinity.	*Sections 4.4, Socioeconomics and 4.7, Noise*
Comments requested that the effect on the county transportation system and roadway network be addressed.	*Section 4.5, Traffic and Circulation*
Comments requested that the air analysis be conducted in a manner that is consistent with the local air district guidelines. It should assess its consistency with the Ventura County Air District's Air Quality Management Plan. A letter from the air district stated that the proposed action would not have a significant district air quality impact.	*Section 4.6, Air Quality*
Comments requested that the noise effects be addressed in the EIS on the Channel Islands Marine Sanctuary, the Channel Islands National Park, Ormand Beach Wildlife Area, and on sports fishing and boating off the coast in the Point Mugu vicinity. Request for noise level information on individual aircraft, not just averaged noise levels. Request for noise analysis that accounts for measured noise levels, flight frequencies, and lowest flight elevations at maximum speeds.	*Sections 4.1, Biological Resources and 4.7, Noise*
Concern was expressed over the effects on people living and working in the flight zones. Information was requested about bird aircraft strike hazard (BASH) avoidance techniques. Comments requested evaluation of the compatibility of the proposed action at Point Mugu with private aircraft in the area. Concerns were raised about the potential public health effects of radiation associated with the proposed action.	*Sections 4.3, Land Use and Airspace and 4.11, Public Health and Safety*
Comments requested consideration of any possible expansion of the E-2 squadron over proposed action levels in the future. Information was requested about the possible linking of squadron activity with other installations or use of joint aircraft operations for testing and other purposes (Navy Project Blue Air Strategy). The proposed action's relationship to granting of the Port Hueneme Hi/Low MOA was questioned.	*Section 5, Cumulative Effects*

A.1.2 NAS Lemoore Alternative (City of Lemoore)

Specific environmental issues or concerns related to the EIS and the sections in which they are addressed are summarized in Table A-2.

Table A-2
Summary of Scoping Comments for NAS Lemoore

Comment	Addressed in Section(s)
It was requested that the EIS address any traffic impacts to county roadways.	*Section 4.5, Traffic and Circulation*
The Westlands Water District representative commented that the district might not always be able to deliver the 3,000 acre-feet of water currently contracted for between the Navy and Westlands.	*Section 4.9, Utilities and Services*
Some of the comment letters expressed support for or opposition to the proposed action at NAS Lemoore based on the availability or unavailability of housing and other community services at the base or in the community.	*Section 4.4, Socioeconomics*

A.1.3 NAF El Centro Alternative (City of El Centro)

Specific environmental issues or concerns related to the EIS and the sections in which they are addressed are summarized in Table A-3.

Table A-3
Summary of Scoping Comments for NAF El Centro

Comment	Addressed in Section(s)
A comment letter from the Imperial County Planning Department expressed concern and support for the proposed realignment of E-2 squadrons to NAF El Centro. Concerns are summarized below.	
– Comply with adopted land use controls to protect NAF El Centro from incompatible uses, to guard public safety, and to encourage the compatible use of NAF El Centro with agriculture and open space.	Sections 4.3, Land Use and Airspace and 4.11, Public Health and Safety
– The E-2 realignment to NAF El Centro should be consistent with the County General Plan (1993) land use element in which factors that may accelerate growth and economic development are addressed.	Sections 4.3, Land Use and Airspace and 4.4, Socioeconomics
– The E-2 realignment to NAF El Centro should be consistent with the 1990 Air Installation Compatible Use Zones (AICUZ) study, which is currently being revised that includes potential air safety, noise and impact analyses for continuing the growth in annual operation levels.	Sections 4.3, Land Use and Airspace, 4.7, Noise, 4.11, and Public Heath and Safety
– Noise impacts of its relocated operations on adjoining urban populations that are contiguous to any and all of the proposed new sites.	Section 4.7, Noise
– Crash and safety hazards to adjoining urbanized and densely populated centers.	Sections 4.3, Land Use and Airspace and 4.11, Public Health and Safety
– Lighting impacts on training operations as a result of urban development, which may preclude true night, field carrier landing practice (FCLP) exercises.	Impacts of the community on the proposed action were not evaluated. Impacts of the proposed action on the community were evaluated. Selection of alternative sites considered the needs of the E-2 mission.

Table A-3
Summary of Scoping Comments for NAF El Centro *(continued)*

Comment	Addressed in Section(s)
– Availability, including costs of acquiring additional land or buffer areas, around the new site for long-term viability and future expansion capacity.	This type of analysis is not typically within the scope of environmental review.
– Restrictions on operating hours due to noise controls, or local noise regulations.	4.7, Noise
– Topographic and weather related factors that would impact operating, training and safety.	These factors were part of the selection process for alternative sites and are not analyzed in the EIS.
– Location of the selected facility by comparing urban restrictions imposed on the operations of the Navy versus open space non urban areas with consideration to the proximity of the San Diego based fleet (i.e., flight time between San Diego based operations and other proposed locations).	These factors were part of the selection process for alternative sites and are not analyzed in the EIS.
– Long-term viability of the new site with regard to topography, climate, open space, local land use support, public support or opposition, public safety, expansion and cost.	These factors were part of the selection process for alternative sites and are not analyzed in the EIS. Public safety is addressed in 4.11, Public Health and Safety, land use issues are addressed in 4.3, Land Use and Airspace
– Relationship of new base site to air-to-ground target ranges, and air-to-air combat training ranges.	These factors were part of the selection process for alternative sites and are not analyzed in the EIS.
– Local as well as political, business, and adjacent community support or opposition.	The scope of the environmental analysis does not include addressing support or opposition for the proposed project; however, specific community environmental concerns are addressed.
– Conflicts, if any, with local airports in the vicinity of any of the proposed sites.	Section 4.3, Land Use and Airspace
– Air quality impacts of the E-2 squadrons on local air standards, and local air quality conditions that may impact (including visibility) the training of E-2 squadron aircrew.	Air quality concerns are addressed in 4.6, Air Quality. Factors such as visibility for the E-2 aircrews was part of the alternative site selection process and is not addressed in the EIS.

A.1.4 NAS North Island (City of Coronado)

NAS North Island was eliminated from detailed consideration in the EIS and consequently, comments received during scoping were not addressed in the document. Table A-4 summarizes the comments received for NAS North Island during the public scoping period.

Table A-4
Summary of Scoping Comments for NAS North Island

Comment
Comments requested that certain information about the proposed action in the fact sheet (prepared for the scoping meetings) be augmented. Specifically it should include the basis for concluding that E-2C flight operations would require eight additional flights per day and identify the total flights per day that would be required. Similarly, the fact sheet specifies that 8,000 practice carrier landings per year would be required, and the EIS should identify the total number of landings required, where these landings would occur, and if the addition of the proposed action would affect the landing requirements of existing aircraft at NAS North Island. Exact E-2 flight paths should be identified, including any changes to existing aircraft flight paths required. Descriptions of the E-2 aircraft, including wingspan, gross weight, type and size of engines, radar power level, wavelength, radar signal strength and distance, and radar power source are requested. Also requested is information about the electromagnetic field generated, including field strength, size, direction, and whether the fields intersect any land areas during flight, takeoffs, or landings. Finally, descriptions are requested for planned flight operations, including the number of monthly training flight operations and scheduled flights.
The effects of radar waves or resulting electromagnetic fields on wildlife should be analyzed. Will the radar have an adverse effect on the number or diversity of unique, rare, endangered, sensitive, or protected plants and animals? Would it have an adverse affect on their migratory or mating patterns? Would there be an adverse effect on the National Wildlife Refuge and Waterbird Management Area in South San Diego Bay?
The EIS should address the proximity of Lindberg Field to NAS North Island.
Comments requested that the EIS consider the effects on property values on Coronado and the potential reduction in quality of life from increases in traffic associated with the proposed action. Concerns were expressed about potential adverse effects on tourism on the island. One requests a presentation of the cost differences for E-2 relocation to NAS North Island versus the other three alternative sites. What would be the impacts on population, housing, building construction, runway construction, expansion or modification. Comments requested that the EIS address the total traffic impacts (quantity of vehicles, noise, vehicle emissions, and highway/street maintenance costs to Coronado citizens. Specific attention should be given to the following locations and issues: – Traffic on Ocean, Fourth, Second, and First streets at peak morning, afternoon, and evening hours – Cumulative traffic impact from squadrons, commands, units facilities, laboratories, schools, depots and ships planned or anticipated to take permanent residence, become a tenant or be homeported at NAS North Island during the next ten years – Impact to traffic flow with a Third Street entrance – Impact to traffic flow with a Third Street entrance, a Fourth Street exit and no regular entry/exit at either Second and/or First streets – Truck traffic supporting facilities modernization, equipment movement, hazardous waste movement and new construction – Total number and percentage of air station and tenant command personnel that will use alternative transportation measures – Impacts to Coronado street parking availability – Impacts to Coronado pedestrians, in particular to school children and seniors during peak traffic hours – Existing truck and other vehicular trips compared to projected trips – A justification provided for the base years used in the traffic analysis, with latest available information recommended – Exact dates for daily traffic volumes should be used

Table A-4
Summary of Scoping Comments for NAS North Island *(continued)*

Comment
– All supporting data for traffic should be included for public review – Requested use of a worst case scenario, rather than an "average" scenario, for traffic analysis – Key intersections should be analyzed for effects Specific focus on the traffic effects on Coronado, rather than or in addition to effects on a broader area
Comments requested that the air analysis be conducted in a manner that is consistent with the local air district guidelines. All supporting data for air quality analysis should be included for public review. A justification provided for the base years used in the air quality analysis, with latest available information recommended. Specific focus on the air quality effects on Coronado, rather than or in addition to effects on a broader area. Any emission offsets required for this proposed action should be identified. Particulate air pollution (to PM 2.5) from the operations and fuel burning of the planes, diesel trucks, and other vehicles should be examined. Dust and carbon pollution should also be analyzed. Concern was expressed about the continuous loading of air toxics in the air basin. Cumulative impacts should include emissions from Site 9 and 11 remediation.
Comments requested that noise contours should be prepared showing the existing noise "footprint," the future noise footprint, and an E-2 only noise footprint, at each alternative site. Also, any noise effects from E-2 aircraft ground operations and maintenance. Concerns were raised about the noise effects on residential and commercial areas within the flight zones. All supporting data for noise should be included for public review. A justification should be provided for the base years used in the noise analysis, with latest available information recommended. Specific focus on the noise effects on Coronado, rather than or in addition to effects on a broader area. Will noise sensors or monitors be installed and observed to detect excessive air traffic noise levels?
Comments request an explanation in the EIS of how impacts to health and safety will be measured. Concern was expressed about the existing risk to residents from Navy aircraft overflights, and the increase in risk that would occur with the proposed action. The EIS should include a full listing of naval air accidents and make available the results of E-2 inspection and operations reports so that the public can assess the risks of a crash from one of these airplanes. All potential cargoes of planes should be revealed and their risks to residents in Coronado assessed. Types of weapons for training and deployment should be discussed. The effects of radar waves or resulting electromagnetic fields on humans should be analyzed. Will the strengths of radar radiation waves and electromagnetic fields be measured and monitored in homes, schools, and beaches? Would additional aircraft fuel storage tanks be required? Potential risks from additional fuel storage and increased likelihood of fuel spills should be analyzed. The anticipated health impacts to residents of communities living downwind of the proposed action should be analyzed.
All waste stream types and quantities should be discussed, as well as disposal sites. Comment requests discussion on how increasing hazardous waste generation at NAS North Island will meet the stated Naval goal of 50 percent reduction of hazardous waste generation at federal facilities in the next few years. There have been occasions that fuel has been dumped by NAS North Island airplanes, and children at a Coronado school were contaminated in a recent incident. Coronado residents complain of a film of jet fuel on their cars and lawn furniture. A full discussion is requested of the frequency and reasons for fuel dumping and the health effects of contact with JP-5 and other fuels used by the planes at NAS North Island. Comment requests that the Navy show as part of this EIS how it will institute pollution prevention in aircraft repair and maintenance.
Comment requests that the Navy reveal its "build-out" plans for NAS North Island so that the cumulative impacts can be anticipated. Comment requests that all future operations loading for the base be identified, including other ships, other cleanups that would result in significant emissions such as Sites 9 and 11, and the Navy's plans for future weapons storage, conventional and nuclear.

A.2 SCOPING LETTER/NOTICE OF INTENT

Notice of Intent to Prepare An Environmental Impact Statement For The Realignment of E-2 Aircraft Squadrons from Naval Air Station, Miramar

Pursuant to Section 102(2)(c) of the National Environmental Policy Act of 1969, as implemented by the Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), the Department of the Navy announces its intent to prepare an Environmental Impact Statement (EIS) to evaluate the environmental effects of realigning the Airborne Early Warning Wing (AEWWING) consisting of four E-2 aircraft squadrons and associated personnel presently located at Naval Air Station (NAS) Miramar to other air stations with compatible missions and functions.

The realignment is in accordance with the legislative requirements of the Defense Base Closure and Realignment Act (DBCRA) of 1990 (Public Law 101-510), as implemented by the Base Realignment and Closure (BRAC) processes of 1993 and 1995. BRAC 1993 and 1995 directed the closure of Marine Corps Air Stations (MCAS) El Toro and Tustin and realigned aviation units, functions and personnel at MCASs El Toro and Tustin to NAS Miramar and MCAS Camp Pendleton. The Navy and Marine Corps agreed to transfer ownership of NAS Miramar from Navy to Marine Corps in September 1997. Accordingly, the four AEWWING squadrons must be relocated from their present location at NAS Miramar.

The proposed action entails relocating four E-2 squadrons (16 aircraft), as well as related support personnel, equipment, and functions from NAS Miramar to other naval air stations. Using operational requirements delineated by the Commander AEWWING, the Navy has identified NAS North Island, NAS Lemoore, Naval Air Warfare Center (NAWC) Point Mugu and Naval Air Facility (NAF) El Centro as potential receiving sites for the relocated squadrons. To accommodate the AEWWING relocation, military construction projects (new construction, expansion, modification or demolition) would be necessary at any receiving site under consideration. The amount of new construction is dependent on availability and compatibility of existing space at each alternative base. In all cases, new or modified hangar space, aircraft parking aprons, maintenance facilities and E-2 specific training facilities would be required. Construction or modification of community support facilities would be based on the adequacy and capacity of existing resources at each base.

The Navy intends to analyze the environmental effects of the realignment and potential construction at the four alternative base locations. Major environmental issues that will be addressed in the EIS include, but are not limited to: geology/soils/seismicity; biology; water resources/hydrology/drainage/flood control; noise; air quality conformity; land use; cultural resources; socio-economics; transportation/circulation; public health and safety/hazardous materials; aesthetics; public services/utilities; and environmental justice.

A.2 SCOPING LETTER/NOTICE OF INTENT *(continued)*

The Navy will initiate a scoping process for the purpose of determining the extent of issues to be addressed and identifying the significant issues related to the AEWWING realignment. The public and interested parties will be invited to participate in the scoping process, to review the draft EIS and to attend a public meeting on the draft EIS. Public scoping meetings will be conducted at 7:00 p.m. near all four alternative base locations on the following dates:

- Tuesday May 21, 1996 at
  Oxnard Center for Performing Arts, Thousand Oaks/Hueneme Room, 800 Hobson Way, Oxnard, California.

- Thursday, May 23, 1996 at
  Imperial County Administration Center, Board of Supervisors Chambers, 940 W. Main Street, El Centro, California.

- Tuesday, May 28, 1996 at
  Coronado High School Auditorium, 650 D Avenue, Coronado, California.

- Wednesday, May 29, 1996 at
  Lemoore Union High School, Cafeteria Back Room, 101 East Bush Street, Lemoore, California.

A brief presentation on the proposed action will precede the request for public comment. Navy representatives will be available at these meetings to receive comments from the public regarding issues of concern. It is important that federal, state, local agencies and interested individuals take this opportunity to identify environmental concerns that should be addressed during the preparation of the draft EIS.

Agencies and the public are invited and encouraged to provide written comments in addition to, or in lieu of, oral comments at the public scoping meetings. To be most helpful, scoping comments should clearly describe specific issues or topics which the commentor believes the draft EIS should address. Written statements or questions regarding the scoping process should be postmarked no later than June 6, 1996, to Commanding Officer, Southwest Division, Naval Facilities Engineering Command, 1220 Pacific Coast Highway, San Diego, CA 92132-5187 (Attention: Ms. Kelly Knight, Code KK.232). Ms. Knight may be reached by phone at (619) 532-1158 or by fax at (619) 532-3824.

A.2 SCOPING LETTER/NOTICE OF INTENT *(continued)*

SCOPING MEETING

FOR THE DEPARTMENT OF THE NAVY'S

DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR THE REALIGNMENT OF E-2 AIRCRAFT SQUADRONS
FROM NAVAL AIR STATION MIRAMAR

AGENDA

1. SPEAKER AND TOPICS

Captain Tad Chamberlain
Commander, Naval Air Force
U.S. Pacific Fleet

Introductions
Meeting Procedures
Purpose and Need
Description of Proposed Action
Facility Requirements
Alternatives Under Consideration
EIS Issues

2. PUBLIC COMMENTS

The principal purpose of this meeting is for the Navy to receive public and agency comments on the content of the Draft EIS. The majority of the time will be devoted to this purpose. Directions on the procedures for participating in this meeting are provided below.

Instructions for Participating in the Scoping Meeting:

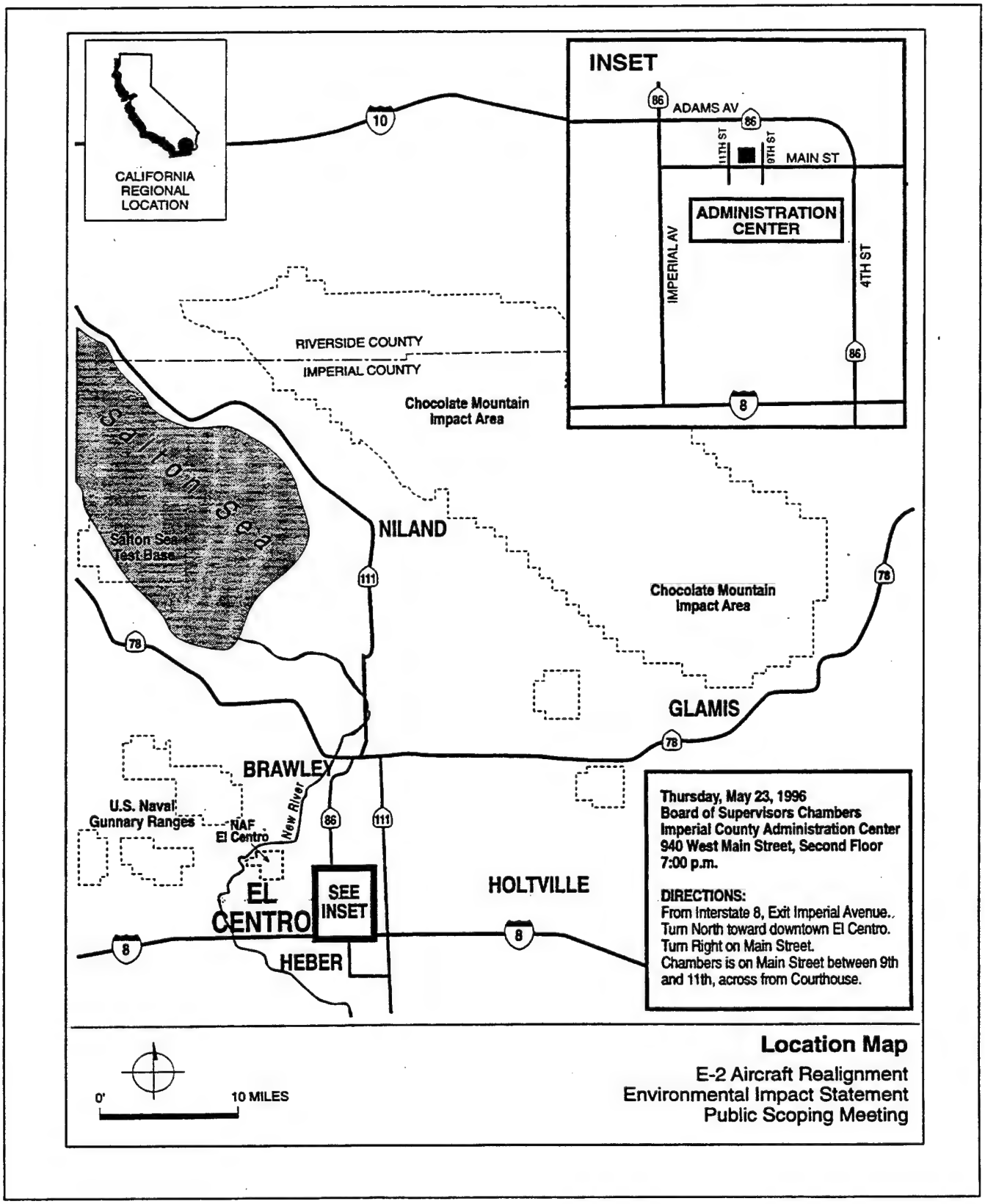
Thank you for attending this scoping meeting. We welcome your comments and input on the Draft EIS. If you wish to speak tonight, please fill out the Speaker's Request Form and give it to one of the EIS project team members. The proceedings of this meeting are being recorded by a stenographer. Please clearly state you name, organization (if applicable), and address prior to speaking. To ensure that everyone has an opportunity to comment, we ask that you limit your spoken comments to no more than five (5) minutes. Written comments may be left in the comment box at the conclusion of this meeting or they may be mailed/faxed to: Commander, Southwest Division, Naval Facilities Engineering Command, Code 232.KK, 1220 Pacific Highway, San Diego, CA 92132-5190 [Fax #: (619) 532-3824]. Comments must be postmarked by June 6, 1996 to become part of the official record.

A.2 SCOPING LETTER/NOTICE OF INTENT *(continued)*

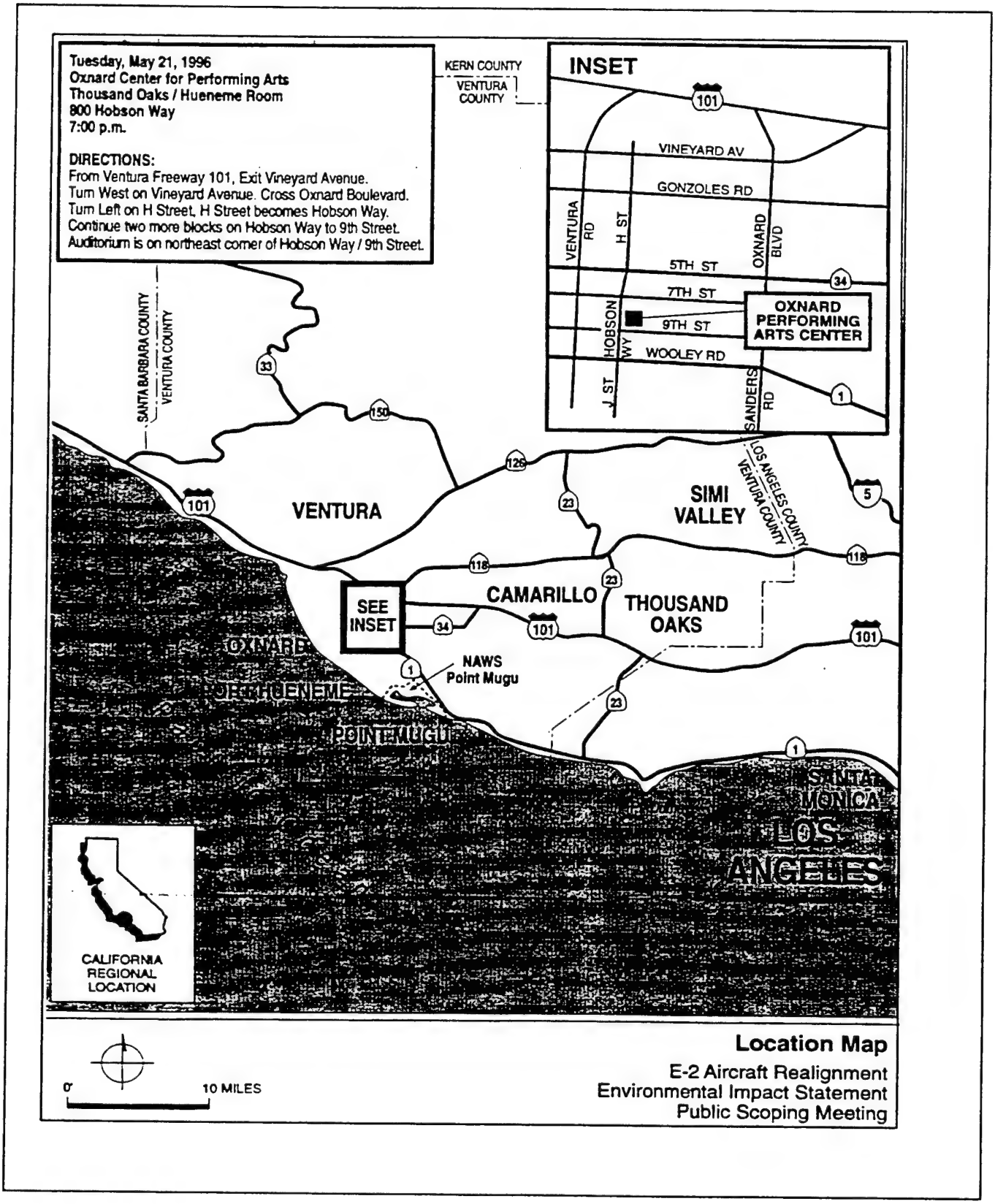
E-2 AIRCRAFT REALIGNMENT FACT SHEET

- **Currently based at Naval Air Station Miramar in San Diego**
- **Size of the project:**
  - 16 E-2C "Hawkeye" aircraft
  - 990 military personnel
  - 1,500 spouses and children
- **Main components of the project:**
  - Airborne Early Warning Wing, Pacific Staff
  - 4 squadrons (4 aircraft and 160 personnel each)
- **Average of 1.5 squadrons deployed continually**
- **Normal work schedule:**
  - Monday through Friday
  - Two shifts (7:00 AM to midnight)
- **E-2C flight operations:**
  - 8 additional flights per day
  - 8,000 practice carrier landings per year
- **Facility requirements:**
  - Hangar
  - Aircraft parking area
  - Maintenance shops
  - Supply area
  - Flight trainers
  - Classroom space
  - Staff offices
- **Proposed timing:**
  - Public Review Draft EIS — Fall 1996
  - Record of Decision — Summer 1997
  - Commence realignment — September 1997

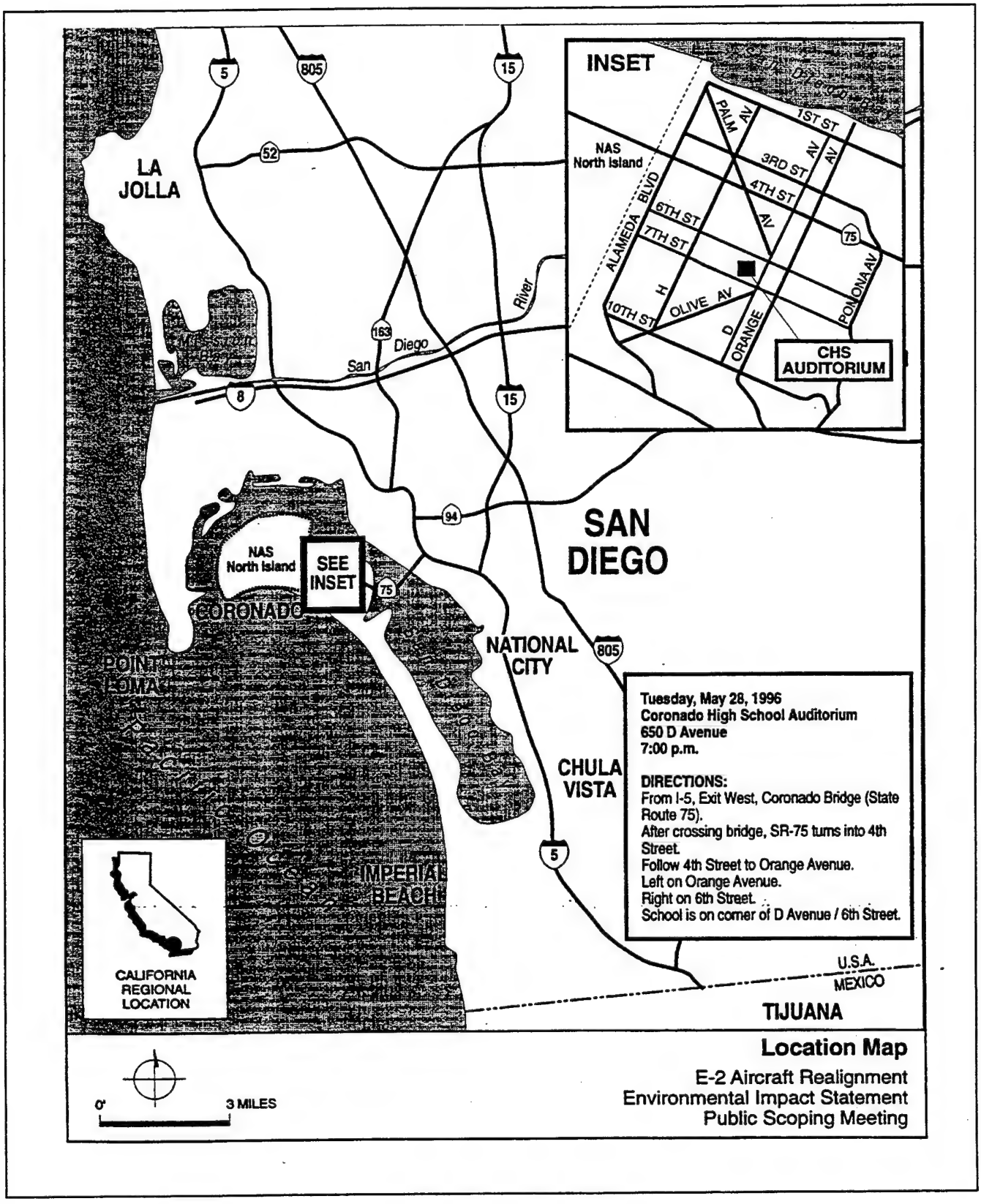
A.2 SCOPING LETTER/NOTICE OF INTENT *(continued)*



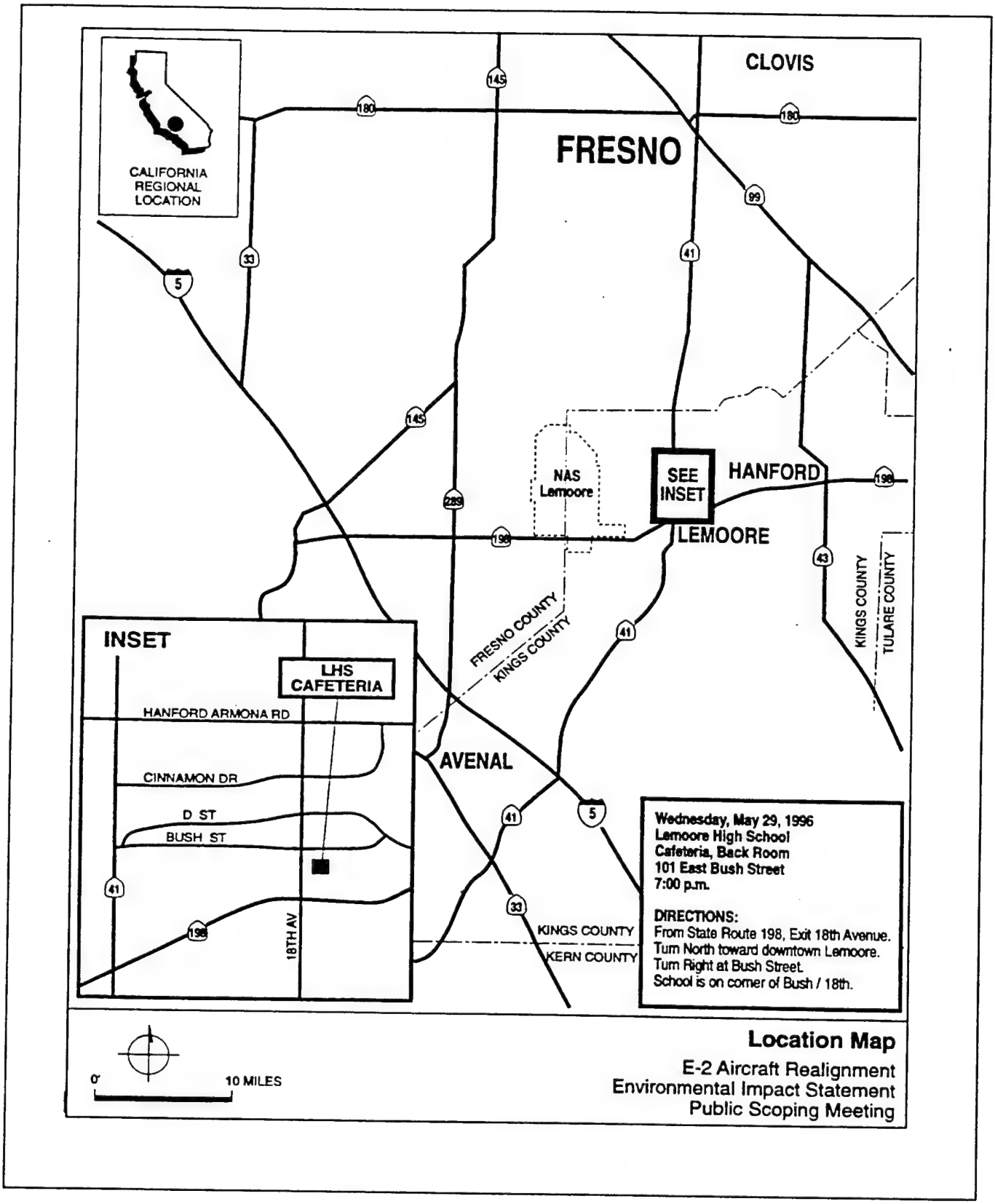
A.2 SCOPING LETTER/NOTICE OF INTENT *(continued)*



A.2 SCOPING LETTER/NOTICE OF INTENT *(continued)*



A.2 SCOPING LETTER/NOTICE OF INTENT *(continued)*



A.3 FEDERAL REGISTER NOTICE

FEDERAL REGISTER NOTICE

Federal Register: May 1, 1996 (Volume 61, Number 85) [Page 19262-19263]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]

DEPARTMENT OF DEFENSE Department of the Navy Notice of Intent To Prepare an Environmental Impact Statement for the Realignment of E-2 Aircraft Squadrons From Naval Air Station, Miramar

SUMMARY: Pursuant to Section 102(2)(c) of the National Environmental Policy [[Page 19263]] Act of 1969, as implemented by the Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), the Department of the Navy announces its intent to prepare an Environmental Impact Statement (EIS) to evaluate the environmental effects of realigning the Airborne Early Warning Wing (AEWWING), consisting of four E-2 aircraft squadrons and associated personnel, presently located at Naval Air Station (NAS) Miramar to another naval air station with compatible mission and function.

The realignment is in accordance with the legislative requirements of the Defense Base Closure and Realignment Act (DBCRA) of 1990 (Public Law 101-510), as implemented by the Base Realignment and Closure (BRAC) processes of 1993 and 1995. BRAC-1993 directed the closure of Marine Corps Air Stations (MCAS) EL Toro and Tustin and realigned aviation units, functions and personnel at MCAS El Toro and MCAS Tustin to NAS Miramar and MCAS Camp Pendleton. The Navy and Marine Corps agreed to transfer ownership of NAS Miramar from Navy to Marine Corps in September 1997. Accordingly, the four AEWWING squadrons must be relocated from their present location at NAS Miramar. The proposed action entails relocating four E-2 squadrons (16 aircraft), as well as related support personnel, equipment, and functions from NAS Miramar to another naval air station. The Navy has identified NAS North Island, NAS Lemoore, Naval Air Warfare Center (NAWC) Point Mugu and Naval Air Facility (NAF) El Centro as potential receiving sites for the relocated squadrons. To accommodate the AEWWING relocation, military construction projects (new construction, expansion, modification or demolition) would be necessary at any receiving site under consideration. The amount of construction required is dependent upon availability and compatibility of existing space at each alternative base. In all cases, new or modified hangar space, aircraft parking aprons, maintenance facilities and E-2 specific training facilities would be required. Construction or modification of community support facilities would be based on the adequacy and capacity of existing resources at each base.

The Navy intends to analyze the environmental effects of the realignment and potential construction at the four alternative base locations. Major environmental issues that will be addressed in the EIS include, but are not limited to: geology/soils/seismicity; biology; water resources/hydrology/drainage/flood control; noise; air quality/ conformity; land use; cultural resources; socioeconomics; transportation/circulation; public health and safety/hazardous materials; aesthetics; public services/utilities; and environmental justice.

The Navy will initiate a scoping process for the purpose of determining the extent of issues to be addressed and identifying the significant issues related to the AEWWING realignment. The public and interested parties are invited to participate in the scoping process, to review the draft EIS, and to attend a public meeting on the draft EIS. Public scoping meetings will be conducted at all four alternative base locations on the following dates starting at 7:00 p.m.:

- Tuesday, May 21, 1996 at the Oxnard Center for Performing Arts, Thousand Oaks/Hueneme Room, 800 Hobson Way, Oxnard, California.

A.2 FEDERAL REGISTER NOTICE *(continued)*

- Thursday, May 23, 1996 at the Board of Supervisors Chambers, County Administration Center (Second Floor), 940 West Main Street, EL Centro, California.

- Tuesday, May 28, 1996 at Coronado High School Auditorium, 650 D Avenue, Coronado, California.

- Wednesday, May 29, 1996 at Lemoore Union High School Cafeteria, Back Room, 101 East Bush Street, Lemoore, California.

A brief presentation on the proposed action will precede the request for public comment. Navy representatives will be available at these meetings to receive comments from the public regarding issues of concern. It is important that federal, state, local agencies and interested individuals take this opportunity to identify environmental concerns that should be addressed during the preparation of the draft EIS.

Agencies and the public are invited and encouraged to provide written comments in addition to, or in lieu of, oral comments at the public scoping meetings. To be most helpful, scoping comments should clearly describe specific issues or topics which the commenter believes the draft EIS should address. In the interest of time, speakers will be asked to limit comments to five minutes.

ADDRESSES: Written statements or questions regarding the scoping process should be postmarked no later than June 6, 1996, to Commanding Officer, Southwest Division, Naval Facilities Engineering Command, 1220 Pacific Highway, San Diego, CA 92132-5190 (Attention: Ms. Kelly Knight, Code 232.KK). Ms. Knight may be reached by phone at (619) 532-1158 or by fax at (619) 532-3824.

Dated: April 26, 1996. M. A. Waters, LCDR, JAGC, USN, Federal Register Liaison Officer. [FR Doc. 96-10744 Filed 4-30-96; 8:45 am] BILLING CODE 3810-FF-M

A.4 NEWSPAPER ADVERTISEMENT

A newspaper advertisement announcing the preparation of this EIS and the start of the public scoping process was published in local newspapers serving the areas surrounding each alternative receiving installation. Newspapers and publication dates are provided in Table A-5. A sample newspaper advertisement is included on the following page.

Table A-5
Newspaper Publication Dates for Scoping Meetings

Newspaper	Publication Dates
Hanford Sentinel	Wednesday, May 15 and Sunday, May 19, 1996
Lemoore Advance	Thursday, May 16 and Thursday, May 23, 1996
Fresno Bee	Wednesday, May 15 and Sunday, May 19, 1996
Imperial Valley Press	Wednesday, May 8 and Sunday, May 12, 1996
San Diego Union Tribune	Sunday, May 12 and Wednesday, May 15, 1996
Eagle (Coronado)	Wednesday, May 22, 1996
Coronado Journal	Friday, May 17, 1996
Ventura County Star	Sunday, May 5 and Wednesday, May 8, 1996
Los Angeles Times, Ventura County Edition	Sunday, May 5 and Wednesday, May 8, 1996

A.4 NEWSPAPER ADVERTISEMENT *(continued)*

1250
LEGAL NOTICES

NOTICE OF INTENT TO PREPARE AN ENVIRONMENTAL IMPACT STATEMENT FOR THE REALIGNMENT OF E-2 AIRCRAFT SQUADRONS FROM NAVAL AIR STATION, MIRAMAR

Pursuant to Section 102(2)(c) of the National Environmental Policy Act of 1969, as implemented by the Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), the Department of the Navy announces its intent to prepare an Environmental Impact Statement (EIS) to evaluate the environmental effects of realigning the Airborne Early Warning Wing (AEWWING), consisting of four E-2 aircraft squadrons and associated personnel, presently located at Naval Air Station (NAS) Miramar to another naval air station with compatible mission and function.

The realignment is in accordance with the legislative requirements of the Defense Base Closure and Realignment Act (DBCRA) of 1990 (Public Law 101-510), as implemented by the Base Realignment and Closure (BRAC) processes of 1993 and 1995. BRAC 1993 and 1995 directed the closure of Marine Corps Air Stations (MCAS) El Toro and Tustin and realigned aviation units, functions and personnel at MCAS El Toro and MCAS Tustin to NAS Miramar and MCAS Camp Pendleton. The Navy and Marine Corps agreed to transfer ownership of NAS Miramar from Navy to Marine Corps in September 1997. Accordingly, the four AEWWING squadrons must be relocated from their present location at NAS Miramar.

The proposed action entails relocating four E-2 squadrons (16 aircraft), as well as related support personnel, equipment, and functions from NAS Miramar to another naval air station. The Navy has identified NAS North Island, NAS Lemoore, Naval Air Warfare Center (NAWC) Point Mugu and Naval Air Facility (NAF) El Centro as potential receiving sites for the relocated squadrons. To accommodate the AEWWING relocation, military construction projects (new construction, expansion, modification or demolition) would be necessary at any receiving site under consideration. The amount of construction required is dependent upon availability and compatibility of existing space at each alternative base. In all cases, new or modified hangar space, aircraft parking aprons, maintenance facilities and E-2 specific training facilities would be required. Construction or modification of community support facilities would be based on the adequacy and capacity of existing resources at each base.

The Navy intends to analyze the environmental effects of the realignment and potential construction at the four alternative base locations. Major environmental issues that will be addressed in the EIS include, but are not limited to: geology/soils/seismicity; biology; water resources/hydrology/drainage/flood control; noise; air quality/conformity; land use; cultural resources; socioeconomics; transportation/circulation; public health and safety/hazardous materials, aesthetics; public services/utilities; and environmental justice.

The Navy will initiate a scoping process for the purpose of determining the extent of issues to be addressed and identifying the significant issues related to the AEWWING realignment. The public and interested parties are invited to participate in the scoping process, to review the draft EIS, and to attend a public meeting on the draft EIS. Public scoping meetings will be conducted at all four alternative base locations on the following dates starting at 7:00 p.m.:

- Tuesday, May 21, 1996 at the Oxnard Center for Performing Arts, Thousand Oaks/Hueneme Room, 800 Hobson Way, Oxnard, California.
- Thursday, May 23, 1996 at the Board of Supervisors Chambers, County Administration Center (Second Floor), 940 West Main Street, El Centro, California.
- Tuesday, May 28, 1996 at Coronado High School Auditorium, 650 D Avenue, Coronado, California.
- Wednesday, May 29, 1996 at Lemoore Union High School, Cafeteria, Back Room, 101 East Bush Street, Lemoore, California.

A brief presentation on the proposed action will precede the request for public comment. Navy representatives will be available at these meetings to receive comments from the public regarding issues of concern. It is important that federal, state, local agencies and interested individuals take this opportunity to identify environmental concerns that should be addressed during the preparation of the draft EIS. In the interest of time, speakers will be asked to limit comments to five (5) minutes.

Agencies and the public are invited and encouraged to provide written comments in addition to, or in lieu of, oral comments at the public scoping meetings. To be most helpful, scoping comments should clearly describe specific issues or topics which the commentor believes the draft EIS should address. Written statements or questions regarding the scoping process should be postmarked no later than June 6, 1996, to Commanding Officer, Southwest Division, Naval Facilities Engineering Command, 1220 Pacific Highway, San Diego, CA 92132-5190 (Attention: Ms. Kelly Knight, Code 232.KK). Ms. Knight may be reached by phone at (619) 532-1158 or by fax at (619) 532-3824.

Appendix B. Biological Resources

APPENDIX B
BIOLOGICAL RESOURCES

This appendix includes Endangered Species Act conformity letters from the Navy to the US Fish and Wildlife Service Ventura, Sacramento, and Carlsbad field offices, and their corresponding responses and threatened and endangered species lists.

DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132-5190

5090
Ser 553.KK/105
June 23, 1997

Ms. Diane Noda, Field Supervisor
US Fish and Wildlife Service (USFWS)
Ventura Field Office
2493 Portola Road, Suite B
Ventura, CA 93003

Subject: SPECIES LIST FOR THE E-2 AIRCRAFT REALIGNMENT ENVIRONMENTAL IMPACT STATEMENT

Dear Ms. Noda:

The Department of the Navy is preparing an environmental impact statement (EIS) in accordance with the National Environmental Policy Act, the Defense Base Closure and Realignment Act of 1990 (Public Law 101-150), and specific base closure and realignment decisions approved by the President and accepted by Congress in September 1995. The purpose of this letter is to coordinate the planned realignment with your agency with regard to conformity with the Endangered Species Act (87 Stat. 884, as amended; 16 USC 1531 et seq.).

The proposed action to be analyzed in the EIS is the realignment of four E-2 squadrons (16 aircraft) and support activities from Naval Air Station (NAS) Miramar to another naval air station. The EIS will analyze the environmental impacts of constructing and/or operating airfield, training, maintenance and personnel support facilities required to carry on the E-2 mission at four alternative base locations—Naval Air Facility (NAF) El Centro, NAS North Island, Naval Air Weapons Station (NAWS) Point Mugu and NAS Lemoore. A description of the proposed action and alternatives is enclosed.

Publication of the Draft EIS is scheduled for October 1997. As part of our consultation with your agency, we request a listing of endangered, threatened, proposed, and candidate species inhabiting the area including their critical habitat, if identified. If possible, please identify which candidate species are likely to be listed prior to the completion of our proposed action in 2000. To assist with your records search, we have identified the US Geological Survey maps applicable to NAWS Point Mugu as the Point Mugu, Camarillo, and Oxnard California quadrangles.

5090
Ser 553.KK/105
June 23, 1997

To facilitate the EIS schedule, we would appreciate receiving your comments within 15 days. Please mail or fax them to:

Ms. Kelly Knight, Project Manager
Naval Facilities Engineering Command, Southwest Division
1220 Pacific Highway, Code 553.KK
San Diego, CA 92132-5190
Fax (619) 532-1242

If you have any questions regarding the proposed action or the EIS, please contact the undersigned at (619) 532-2456.

Kelly K. Knight
By direction of the
Commanding Officer

Enclosure (1) Proposed Action and Alternatives

DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132-5190

5090
Ser 553.KK/105
June 23,1997

Mr. Wayne White, Field Supervisor
US Fish and Wildlife Service (USFWS)
Sacramento Field Office
3310 El Camino Avenue, Suite 130
Sacramento, CA 95821

Subject: SPECIES LIST FOR THE E-2 AIRCRAFT REALIGNMENT ENVIRONMENTAL IMPACT STATEMENT

Dear Mr. White:

The Department of the Navy is preparing an environmental impact statement (EIS) in accordance with the National Environmental Policy Act, the Defense Base Closure and Realignment Act of 1990 (Public Law 101-150), and specific base closure and realignment decisions approved by the President and accepted by Congress in September 1995. The purpose of this letter is to coordinate the planned realignment with your agency with regard to conformity with the Endangered Species Act (87 Stat. 884, as amended; 16 USC 1531 et seq.).

The proposed action to be analyzed in the EIS is the realignment of four E-2 squadrons (16 aircraft) and support activities from Naval Air Station (NAS) Miramar to another naval air station. The EIS will analyze the environmental impacts of constructing and/or operating airfield, training, maintenance and personnel support facilities required to carry on the E-2 mission at four alternative base locations—Naval Air Facility (NAF) El Centro, NAS North Island, Naval Air Weapons Station (NAWS) Point Mugu and NAS Lemoore. A description of the proposed action and alternatives is enclosed.

Publication of the Draft EIS is scheduled for October 1997. As part of our consultation with your agency, we request a listing of endangered, threatened, proposed, and candidate species inhabiting the area including their critical habitat, if identified. If possible, please identify which candidate species are likely to be listed prior to the completion of our proposed action in 2000. To assist with your records search, we have identified the US Geological Survey map applicable to NAS Lemoore as the Vanguard, California quadrangle.

5090
Ser 553.KK/105
June 23, 1997

To facilitate the EIS schedule, we would appreciate receiving your comments within 15 days. Please mail or fax them to:

Ms. Kelly Knight, Project Manager
Naval Facilities Engineering Command, Southwest Division
1220 Pacific Highway, Code 553.KK
San Diego, CA 92132-5190
Fax (619) 532-1242

If you have any questions regarding the proposed action or the EIS, please contact the undersigned at (619) 532-2456.

Kelly K. Knight
By direction of the
Commanding Officer

Enclosure (1) Proposed Action and Alternatives

DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132-5190

5090
Ser 553.KK/105
June 23, 1997

Mr. John Bradley, Branch Chief
US Fish and Wildlife Service (USFWS)
Carlsbad Field Office
2730 Loker Avenue West
Carlsbad, CA 92008

Subject: SPECIES LIST FOR THE E-2 AIRCRAFT REALIGNMENT ENVIRONMENTAL IMPACT STATEMENT

Dear Mr. Bradley:

The Department of the Navy is preparing an environmental impact statement (EIS) in accordance with the National Environmental Policy Act, the Defense Base Closure and Realignment Act of 1990 (Public Law 101-150), and specific base closure and realignment decisions approved by the President and accepted by Congress in September 1995. The purpose of this letter is to coordinate the planned realignment with your agency with regard to conformity with the Endangered Species Act (87 Stat. 884, as amended; 16 USC 1531 et seq.).

The proposed action to be analyzed in the EIS is the realignment of four E-2 squadrons (16 aircraft) and support activities from Naval Air Station (NAS) Miramar to another naval air station. The EIS will analyze the environmental impacts of constructing and/or operating airfield, training, maintenance and personnel support facilities required to carry on the E-2 mission at four alternative base locations—Naval Air Facility (NAF) El Centro, NAS North Island, Naval Air Weapons Station (NAWS) Point Mugu and NAS Lemoore. A description of the proposed action and alternatives is enclosed.

Publication of the Draft EIS is scheduled for October 1997. As part of our consultation with your agency, we request a listing of endangered, threatened, proposed, and candidate species inhabiting the area including their critical habitat, if identified. If possible, please identify which candidate species are likely to be listed prior to the completion of our proposed action in 2000. To assist with your records search, we have identified the US Geological Survey map applicable to NAS North Island as the Point Loma, California quadrangle and for NAF El Centro we have identified the Seeley, California quadrangle.

5090
Ser 553.KK/105
June 23, 1997

To facilitate the EIS schedule, we would appreciate receiving your comments within 15 days. Please mail or fax them to:

Ms. Kelly Knight, Project Manager
Naval Facilities Engineering Command, Southwest Division
1220 Pacific Highway, Code 553.KK
San Diego, CA 92132-5190
Fax (619) 532-1242

If you have any questions regarding the proposed action or the EIS, please contact the undersigned at (619) 532-2456.

Kelly K. Knight
By direction of the
Commanding Officer

Enclosure (1) Proposed Action and Alternatives

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

July 29, 1997

Kelly K. Knight, Project Manager
Naval Facilities Engineering Command, Southwest Division
1220 Pacific Highway, Code 553.KK
San Diego, California 92132-5190

Subject: Species List for Point Mugu Naval Air Warfare Center and San Nicolas Island, Ventura County, California

Dear Ms. Knight:

This letter is in response to your request for information on listed, proposed, and candidate species that may occur in the vicinity of the Point Mugu Naval Air Weapons Station and San Nicolas Island, Ventura County, California. Your request was received by the U.S. Fish and Wildlife Service (Service) on June 27, 1997. The requested information will be used by the Department of the Navy (Navy) as part of its project analysis for assessing the effects of its realignment of four E-2 squadrons and support activities from another Naval Air Station. We recommend you contact our Sacramento Fish and Wildlife Office for a list of species for your facility at Lemoore, Kings County, California and our Carlsbad Fish and Wildlife Office for lists of species for the facilities at El Centro and North Island.

If the proposed project may affect a listed species, the Navy, as lead Federal agency, has the responsibility to prepare a biological assessment if the project is a construction project which may require an environmental impact statement[1]. If a biological assessment is not required, the Navy still has the responsibility to review its proposed activities and determine whether the listed species will be affected.

During the assessment or review process, the Navy may engage in planning efforts, but may not make any irreversible commitment of resources. Such a commitment could constitute a violation of section 7(d) of the Endangered Species Act of 1973 as amended (Act). If a listed species may be affected, the Navy should request, in writing through our office, consultation pursuant to section 7 of the Act. Informal consultation may be used to exchange information and resolve conflicts with respect to listed species prior to a written request for formal consultation.

Federal agencies are required to confer with the Service, pursuant to section 7(a)(4) of the Act, when an agency action is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat (50 CFR 402.10(a)). A request for formal conference must be in writing and should include the same information that would be provided for a request for formal consultation. Conferences can also include discussions between the Service and the Federal agency to identify and resolve potential conflicts between an action and proposed species or proposed critical habitat early in the decision-making process. The Service recommends ways to minimize or avoid adverse effects of the action. These recommendations are advisory because the jeopardy prohibition of section 7(a)(2) of the Act does not apply until the species is listed or the proposed critical habitat is designated. The conference process fulfills the need to inform Federal agencies of possible steps that an agency might take at an early stage to adjust its actions to avoid jeopardizing a proposed species.

When a proposed species or proposed critical habitat may be affected by an action, the lead Federal agency may elect to enter into formal conference with the Service even if the action is not likely to jeopardize or result in the destruction or adverse modification of proposed critical habitat. If the proposed species is listed or the proposed critical habitat is designated after completion of the conference, the Federal agency may ask the Service, in writing, to confirm the conference as a formal consultation. If the Service reviews the proposed action and finds that no significant changes in the action as planned or in the information used during the conference have occurred, the Service will confirm the conference as a formal consultation on the project and no further section 7 consultation will be necessary. Use of the formal conference process in this manner can prevent delays in the event the proposed species is listed or the proposed critical habitat is designated during project development or implementation.

I have enclosed a list of threatened, endangered, and candidate species. To the best of our present knowledge, no species proposed for listing are known to occur in the vicinity of the action. We recently rediscovered the Ventura marsh milk-vetch (*Astragalus pycnostachyus* var. *lanosissimus*) in the vicinity of Oxnard, Ventura County. This species was thought to be extinct and was once known from the vicinity of Pt. Mugu. It is currently a Federal species of concern. However, its Federal status may change. Therefore, we added it to the enclosed list of species. We recommend that you review information in the California Department of Fish and Game's Natural Diversity Data Base to determine whether any additional species of concern occur in the area. We also recommend you contact the National Marine Fisheries Service for species under its jurisdiction.

Should you have any questions regarding the species on the enclosed list or your responsibilities under the Act, please contact Kate Symonds of my staff at (805) 644-1766.

Sincerely,

Diane K. Noda

Diane K. Noda
Field Supervisor

Enclosure

1/ "Construction Project" means any major Federal action which significantly affects the quality of the human environment designed primarily to result in the building or erection of man-made structures such as dams, buildings, roads, pipelines, channels and the like. This includes Federal actions such as permits, grants, licenses, or other forms of Federal authorizations or approval which may result in construction.

LISTED AND CANDIDATE SPECIES WHICH MAY OCCUR IN THE VICINITY OF POINT MUGU NAVAL AIR WEAPONS CENTER AND SAN NICOLAS ISLAND, VENTURA COUNTY, CALIFORNIA

Mammals		
Southern sea otter **	*Enhydra lutris nereis*	T
Birds		
American peregrine falcon **	*Falco peregrinus anatum*	E
Brown pelican **	*Pelecanus occidentalis*	E
California least tern	*Sterna antillarum browni*	E
Light-footed clapper rail	*Rallus longirostris levipes*	E
Western snowy plover **	*Charadrius alexandrinus nivosus*	T, PCH
Reptiles		
Island night lizard *	*Xantusia riversiana*	T
Plants		
Salt marsh bird's-beak	*Cordylanthus maritimus* ssp. *maritimus*	E
Ventura marsh milk-vetch	*Astragalus pycnostachyus* var. *lanosissimus*	

Key:
E - Endangered
T - Threatened
PCH - Proposed Critical Habitat
C - Candidate species for which the Fish and Wildlife Service has on file sufficient information on the biological vulnerability and threats to support proposals to list as endangered or threatened.

* - indicates species found only on San Nicolas Island
** - indicates species that may occur on both San Nicolas Island and at Point Mugu

Portions of the above list were generated through use of the California Department of Fish and Game's Natural Diversity Data Base. Verification of the accuracy of this information is the responsibility of the project proponent; field surveys during the appropriate seasons may be required. If you have any questions about the Natural Diversity Data Base, contact the California Department of Fish and Game at (916) 324-3812.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
3310 El Camino Avenue, Suite 130
Sacramento, California 95821-6340

IN REPLY REFER TO:
1-1-97-SP-1655

August 11, 1997

Ms. Kelly Knight, Project Manager
Naval Facilities Engineering Command, Southwest Division
1220 Pacific Highway, Code 553.KK
San Diego, California 92132-5190

Subject: Species Lists for Proposed E-2 Aircraft Realignment EIS, Lemoore

Dear Ms. Knight:

As requested by letter from your agency dated June 23, 1997, you will find enclosed lists of sensitive species that may be present in *or may be affected by* projects in the subject project area (see Enclosure A). These lists fulfill the requirement of the Fish and Wildlife Service (Service) to provide species lists pursuant to section 7(c) of the Endangered Species Act of 1973, as amended (Act).

The Service used the information in your letter to locate the proposed project on a U.S. Geological Survey (USGS) 7.5 minute quadrangle map. The animal species on the Enclosure A quad list[s] are those species we believe may occur within, *or be affected by projects within*, the QUAD 336C, and counties of Fresno and Kings, where your project is planned.

Any plants on the Enclosure A quad list[s] are those *that have actually been observed* in the project quad[s]. Plants on the county list[s] may also occur in the quad[s] where your project is planned.

Some of the species listed in Enclosure A may not be affected by the proposed action. A trained biologist or botanist, familiar with the habitat requirements of the listed species, should determine whether these species or habitats suitable for these species may be affected by the proposed action. For plant surveys, the Service recommends using the enclosed Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Species (Enclosure C).

Some pertinent information concerning the distribution, life history, habitat requirements, and published references for the listed species is available upon request. This information may be helpful in preparing the biological assessment for this project, if one is required. Please see Enclosure B for a discussion of the responsibilities Federal agencies have under section 7(c) of the Act and the conditions under which a biological assessment must be prepared by the lead Federal agency or its designated non-Federal representative.

Ms. Kelly Knight, Project Manager

Formal consultation, pursuant to 50 CFR § 402.14, should be initiated if you determine that a listed species may be affected by the proposed project. If you determine that a proposed species may be adversely affected, you should consider requesting a conference with our office pursuant to 50 CFR § 402.10. Informal consultation may be utilized prior to a written request for formal consultation to exchange information and resolve conflicts with respect to a listed species. If a biological assessment is required, and it is not initiated within 90 days of your receipt of this letter, you should informally verify the accuracy of this list with our office.

Candidate species are currently being reviewed by the Service and are under consideration for possible listing as endangered or threatened. Candidate species have no protection under the Endangered Species Act, but are included for your consideration as it is possible that one or more of these candidates could be proposed and listed before the subject project is completed. Should the biological assessment reveal that candidate species may be adversely affected, you may wish to contact our office for technical assistance. One of the potential benefits from such technical assistance is that by exploring alternatives early in the planning process, it may be possible to avoid conflicts that could otherwise develop, should a candidate species become listed before the project is completed.

In the Federal Register of February 28, 1996, the Service changed its policy on candidate species. The term *candidate* now strictly refers to species for which the Service has on file enough information to propose listing as endangered or threatened. Former *category 2 candidate* species - species for which listing is possibly appropriate but for which the Service lacks sufficient information to support a listing proposal - are now called *species of concern.* They are no longer monitored by the Service. However we have retained them on the enclosed list for general information. We encourage consideration of them in project planning, as they may become candidate species in the future.

If the proposed project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by the U.S. Army Corps of Engineers (Corps), a Corps permit will be required, pursuant to section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act. Impacts to wetland habitats require site specific mitigation and monitoring. You may request a copy of the Service's General Mitigation and Monitoring Guidelines or submit a detailed description of the proposed impacts for specific comments and recommendations. If you have any questions regarding wetlands, contact Mark Littlefield at (916) 979-2113.

Ms. Kelly Knight, Project Manager

Please contact Peter Cross at (916) 979-2725 if you have any questions regarding the attached list or your responsibilities under the Endangered Species Act. For the fastest response to species list requests, address them to the attention of the section 7 office assistant at this address.

Sincerely,

Patti Leonard

for Wayne S. White
Field Supervisor

Enclosures

ENCLOSURE A

Endangered and Threatened Species that May Occur in
or be Affected by Projects in the Following Selected Quads
Reference File No. 1655
August 10, 1997

QUAD : 336C VANGUARD

Listed Species

Mammals

giant kangaroo rat, *Dipodomys ingens* (E)

Fresno kangaroo rat, *Dipodomys nitratoides exilis* (E)

Tipton kangaroo rat, *Dipodomys nitratoides nitratoides* (E)

San Joaquin kit fox, *Vulpes macrotis mutica* (E)

Birds

American peregrine falcon, *Falco peregrinus anatum* (E)

Aleutian Canada goose, *Branta canadensis leucopareia* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

blunt-nosed leopard lizard, *Gambelia (=Crotaphytus) silus* (E)

giant garter snake, *Thamnophis gigas* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

delta smelt, *Hypomesus transpacificus* (T)

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

Candidate Species

Birds

mountain plover, *Charadrius montanus* (C)

Species of Concern

Mammals

Nelson's antelope ground squirrel, *Ammospermophilus nelsoni* (SC)

short-nosed kangaroo rat, *Dipodomys nitratoides brevinasus* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

QUAD : 336C VANGUARD

Species of Concern

Mammals

small-footed myotis bat, *Myotis ciliolabrum* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

Tulare grasshopper mouse, *Onychomys torridus tularensis* (SC)

San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Pacific western big-eared bat, *Plecotus townsendii townsendii* (SC)

Birds

western burrowing owl, *Athene cunicularia hypugea* (SC)

ferruginous hawk, *Buteo regalis* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (SC)

white-faced ibis, *Plegadis chihi* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

southwestern pond turtle, *Clemmys marmorata pallida* (SC)

San Joaquin whipsnake, *Masticophis flagellum ruddocki* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

western spadefoot toad, *Scaphiopus hammondii* (SC)

Invertebrates

molestan blister beetle, *Lytta molesta* (SC)

ENCLOSURE A

Endangered and Threatened Species that May Occur in or be Affected by
Projects in the Area of the Following California County or Counties
Reference File No. 1655

August 10, 1997

FRESNO COUNTY

Listed Species

Mammals

- giant kangaroo rat, *Dipodomys ingens* (E)
- Fresno kangaroo rat, *Dipodomys nitratoides exilis* (E)
- Fresno kangaroo rat critical habitat, *Dipodomys nitratoides exilis* (E)
- Tipton kangaroo rat, *Dipodomys nitratoides nitratoides* (E)
- San Joaquin kit fox, *Vulpes macrotis mutica* (E)

Birds

- American peregrine falcon, *Falco peregrinus anatum* (E)
- California condor, *Gymnogyps californianus* (E)
- Aleutian Canada goose, *Branta canadensis leucopareia* (T)
- bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

- blunt-nosed leopard lizard, *Gambelia (=Crotaphytus) silus* (E)
- giant garter snake, *Thamnophis gigas* (T)

Amphibians

- California red-legged frog, *Rana aurora draytonii* (T)

Fish

- delta smelt, *Hypomesus transpacificus* (T)
- Paiute cutthroat trout, *Oncorhynchus (=Salmo) clarki seleniris* (T)

Invertebrates

- vernal pool fairy shrimp, *Branchinecta lynchi* (T)
- valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

Plants

- California jewelflower, *Caulanthus californicus* (E)
- palmate-bracted bird's-beak, *Cordylanthus palmatus* (E)
- San Joaquin wooly-threads, *Lembertia congdonii* (E)
- Hartweg's golden sunburst, *Pseudobahia bahiifolia* (E)

FRESNO COUNTY

Listed Species

Plants

- San Joaquin adobe sunburst, *Pseudobahia peirsonii* (E)
- San Benito evening-primrose, *Camissonia benitensis* (T)
- fleshy owl's-clover, *Castilleja campestris ssp. succulenta* (T)
- Hoover's wooly-star, *Eriastrum hooveri* (T)
- San Joaquin Valley Orcutt grass, *Orcuttia inaequalis* (T)
- Greene's tuctoria, *Tuctoria greenei* (E)

Proposed Species

Fish

- Central Valley steelhead, *Oncorhynchus mykiss* (PE)
- Sacramento splittail, *Pogonichthys macrolepidotus* (PT)

Plants

- Mariposa pussy-paws, *Calyptridium pulchellum* (PE)
- carpenteria, *Carpenteria californica* (PT)

Candidate Species

Mammals

- San Joaquin Valley woodrat, *Neotoma fuscipes riparia* (C)

Birds

- mountain plover, *Charadrius montanus* (C)

Amphibians

- California tiger salamander, *Ambystoma californiense* (C)

Species of Concern

Mammals

- Nelson's antelope ground squirrel, *Ammospermophilus nelsoni* (SC)
- short-nosed kangaroo rat, *Dipodomys nitratoides brevinasus* (SC)
- spotted bat, *Euderma maculatum* (SC)
- greater western mastiff-bat, *Eumops perotis californicus* (SC)
- California wolverine, *Gulo gulo luteus* (SC)

FRESNO COUNTY

Species of Concern

Mammals

- Pacific fisher, *Martes pennanti pacifica* (SC)
- small-footed myotis bat, *Myotis ciliolabrum* (SC)
- long-eared myotis bat, *Myotis evotis* (SC)
- fringed myotis bat, *Myotis thysanodes* (SC)
- long-legged myotis bat, *Myotis volans* (SC)
- Yuma myotis bat, *Myotis yumanensis* (SC)
- Southern grasshopper mouse, *Onychomys torridus ramona* (SC)
- Tulare grasshopper mouse, *Onychomys torridus tularensis* (SC)
- California bighorn sheep, *Ovis canadensis californiana* (SC)
- San Joaquin pocket mouse, *Perognathus inornatus* (SC)
- pale Townsend's big-eared bat, *Plecotus townsendii pallescens* (SC)
- Pacific western big-eared bat, *Plecotus townsendii townsendii* (SC)
- Mt. Lyell shrew, *Sorex lyelli* (SC)
- Sierra Nevada red fox, *Vulpes vulpes necator* (SC)

Birds

- northern goshawk, *Accipiter gentilis* (SC)
- tricolored blackbird, *Agelaius tricolor* (SC)
- western burrowing owl, *Athene cunicularia hypugea* (SC)
- ferruginous hawk, *Buteo regalis* (SC)
- little willow flycatcher, *Empidonax traillii brewsteri* (SC)
- white-faced ibis, *Plegadis chihi* (SC)
- California spotted owl, *Strix occidentalis occidentalis* (SC)

Reptiles

- silvery legless lizard, *Anniella pulchra pulchra* (SC)
- northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
- southwestern pond turtle, *Clemmys marmorata pallida* (SC)
- San Joaquin whipsnake, *Masticophis flagellum ruddocki* (SC)
- California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

- Yosemite toad, *Bufo canorus* (SC)
- Mount Lyell salamander, *Hydromantes platycephalus* (SC)
- foothill yellow-legged frog, *Rana boylii* (SC)

FRESNO COUNTY

Species of Concern

Amphibians

- mountain yellow-legged frog, *Rana muscosa* (SC)
- western spadefoot toad, *Scaphiopus hammondii* (SC)

Fish

- green sturgeon, *Acipenser medirostris* (SC)
- river lamprey, *Lampetra ayresi* (SC)
- Kern brook lamprey, *Lampetra hubbsi* (SC)
- Pacific lamprey, *Lampetra tridentata* (SC)
- longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

- Ciervo aeglialian scarab beetle, *Aeglialia concinna* (SC)
- San Joaquin tiger beetle, *Cicindela tranquebarica ssp* (SC)
- San Joaquin dune beetle, *Coelus gracilis* (SC)
- Kings Canyon cryptochian caddisfly, *Cryptochia excella* (SC)
- Wooly hydroporus diving beetle, *Hydroporus diving beetle* (SC)
- Hopping's blister beetle, *Lytta hoppingi* (SC)
- moestan blister beetle, *Lytta moesta* (SC)
- molestan blister beetle, *Lytta molesta* (SC)
- Morrison's blister beetle, *Lytta morrisoni* (SC)
- Dry Creek cliff strider bug, *Oravelia pege* (SC)
- Bohart's blue butterfly, *Philotiella speciosa bohartorum* (SC)
- Sierra pygmy grasshopper, *Tetrix sierrana* (SC)

Plants

- obovate-leaved thornmint, *Acanthomintha obovata ssp. obovata* (SC)
- forked fiddleneck, *Amsinckia vernicosa var. furcata* (SC)
- Bodie Hills rock-cress, *Arabis bodiensis* (SC)
- Raven's milk-vetch, *Astragalus monoensis var. ravenii* (SC)
- heartscale, *Atriplex cordulata* (SC)
- brittlescale, *Atriplex depressa* (SC)
- Lost Hills saltbush, *Atriplex vallicola* (SC)
- South Coast Range morning-glory, *Calystegia collina ssp. venusta* (SC)
- Mono Hot Springs evening-primrose, *Camissonia sierrae ssp. alticola* (SC)
- San Benito spineflower, *Chorizanthe biloba var. immemora* (SC)

FRESNO COUNTY

Species of Concern

Plants

- Fresno County bird's-beak, *Cordylanthus tenuis ssp. barbatus* (SC)
- recurved larkspur, *Delphinium recurvatum* (SC)
- mouse buckwheat, *Eriogonum nudum var. murinum* (SC)
- spiny-sepaled coyote-thistle, *Eryngium spinosepalum* (SC)
- hollisteria, *Hollisteria lanata* (SC)
- delta tule-pea, *Lathyrus jepsonii var. jepsonii* (SC)
- rayless layia, *Layia discoidea* (SC)
- Panoche peppergrass, *Lepidium jaredii var. album* (SC)
- long-petaled lewisia, *Lewisia longipetala* (SC)
- orange lupine, *Lupinus citrinus var. citrinus* (SC)
- valley sagittaria, *Sagittaria sanfordii* (SC)
- parasol clover, *Trifolium bolanderi* (SC)
- lesser saltscale, *Atriplex minuscula* (SC)
- pale-yellow layia, *Layia heterotricha* (SC)

KINGS COUNTY

Listed Species

Mammals

- giant kangaroo rat, *Dipodomys ingens* (E)
- Fresno kangaroo rat, *Dipodomys nitratoides exilis* (E)
- Tipton kangaroo rat, *Dipodomys nitratoides nitratoides* (E)
- San Joaquin kit fox, *Vulpes macrotis mutica* (E)

Birds

- American peregrine falcon, *Falco peregrinus anatum* (E)
- California condor, *Gymnogyps californianus* (E)
- Aleutian Canada goose, *Branta canadensis leucopareia* (T)
- bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

- blunt-nosed leopard lizard, *Gambelia (=Crotaphytus) silus* (E)
- giant garter snake, *Thamnophis gigas* (T)

KINGS COUNTY

Listed Species

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

delta smelt, *Hypomesus transpacificus* (T)

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

Plants

San Joaquin wooly-threads, *Lembertia congdonii* (E)

Hoover's wooly-star, *Eriastrum hooveri* (T)

California jewelflower, *Caulanthus californicus* (E)

Proposed Species

Fish

Sacramento splittail, *Pogonichthys macrolepidotus* (PT)

Candidate Species

Birds

mountain plover, *Charadrius montanus* (C)

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Species of Concern

Mammals

Nelson's antelope ground squirrel, *Ammospermophilus nelsoni* (SC)

short-nosed kangaroo rat, *Dipodomys nitratoides brevinasus* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

KINGS COUNTY

Species of Concern

Mammals

- Yuma myotis bat, *Myotis yumanensis* (SC)
- Southern grasshopper mouse, *Onychomys torridus ramona* (SC)
- Tulare grasshopper mouse, *Onychomys torridus tularensis* (SC)
- San Joaquin pocket mouse, *Perognathus inornatus* (SC)
- Pacific western big-eared bat, *Plecotus townsendii townsendii* (SC)
- Sierra Nevada red fox, *Vulpes vulpes necator* (SC)

Birds

- tricolored blackbird, *Agelaius tricolor* (SC)
- western burrowing owl, *Athene cunicularia hypugea* (SC)
- ferruginous hawk, *Buteo regalis* (SC)
- little willow flycatcher, *Empidonax traillii brewsteri* (SC)
- white-faced ibis, *Plegadis chihi* (SC)
- San Joaquin LeConte's thrasher, *Toxostoma lecontei macmillanorum* (SC)

Reptiles

- silvery legless lizard, *Anniella pulchra pulchra* (SC)
- northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
- southwestern pond turtle, *Clemmys marmorata pallida* (SC)
- San Joaquin whipsnake, *Masticophis flagellum ruddocki* (SC)
- California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

- foothill yellow-legged frog, *Rana boylii* (SC)
- western spadefoot toad, *Scaphiopus hammondii* (SC)

Fish

- Kern brook lamprey, *Lampetra hubbsi* (SC)

Invertebrates

- Ciervo aegialian scarab beetle, *Aegialia concinna* (SC)
- San Joaquin dune beetle, *Coelus gracilis* (SC)
- molestan blister beetle, *Lytta molesta* (SC)
- Doyen's trigonascuta dune weevil, *Trigonoscuta doyeni* (SC)

KINGS COUNTY

Species of Concern

Plants

forked fiddleneck, *Amsinckia vernicosa var. furcata* (SC)

heartscale, *Atriplex cordulata* (SC)

Lost Hills saltbush, *Atriplex vallicola* (SC)

slough thistle, *Cirsium crassicaule* (SC)

recurved larkspur, *Delphinium recurvatum* (SC)

pale-yellow layia, *Layia heterotricha* (SC)

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
(*)	Possibly extinct.	
	Critical Habitat	Area essential to the conservation of a species.

Enclosure B

FEDERAL AGENCIES' RESPONSIBILITIES UNDER SECTIONS 7(a) and (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a) Consultation/Conference

Requires: (1) federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species; (2) Consultation with FWS when a federal action may affect a listed endangered or threatened species to insure that any action authorized, funded, or carried out by a federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The process is initiated by the federal agency after determining the action may affect a listed species; and (3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat.

SECTION 7(c) Biological Assessment-Major Construction Activity[1]

Requires federal agencies or their designees to prepare a Biological Assessment (BA) for major construction activities. The BA analyzes the effects of the action[2] on listed and proposed species. The process begins with a Federal agency requesting from FWS a list of proposed and listed threatened and endangered species. The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the list, the accuracy of the species list should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may proceed; however, no construction may begin.

We recommend the following for inclusion in the BA: an on-site inspection of the area affected by the proposal which may include a detailed survey of the area to determine if the species or suitable habitat is present; a review of literature and scientific data to determine species' distribution, habitat needs, and other biological requirement; interviews with experts, including those within FWS, State conservation departments, universities and others who may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of indirect effects of the proposal on the species and its habitat; an analysis of alternative actions considered. The BA should document the results, including a discussion of study methods used, and problems encountered, and other relevant information. The BA should conclude whether or not a listed or proposed species will be affected. Upon completion, the BA should be forwarded to our office.

---

[1] A construction project (or other undertaking having similar physical impacts) which is a major federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U.S.C. 4332(2)C).

[2] "Effects of the action" refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action.

Enclosure C

Guidelines For Conducting And Reporting Botanical Inventories For Federally Listed, Proposed And Candidate Plants

(September 23, 1996)

These guidelines describe protocols for conducting botanical inventories for federally listed, proposed and candidate plants, and describe minimum standards for reporting results. The Service will use, in part, the information outlined below in determining whether the project under consideration may affect any listed, proposed or candidate plants, and in determining the direct, indirect, and cumulative effects.

Field inventories should be conducted in a manner that will locate listed, proposed, or candidate species (target species) that may be present. The entire project area requires a botanical inventory, except developed agricultural lands. The field investigator(s) should:

1. Conduct inventories at the appropriate times of year when target species are present and identifiable. Inventories will include all potential habitats. Multiple site visits during a field season may be necessary to make observations during the appropriate phenological stage of all target species.

2. If available, use a regional or local reference population to obtain a visual image of the target species and associated habitat(s). If access to reference populations(s) is not available, investigators should study specimens from local herbaria.

3. List every species observed and compile a comprehensive list of vascular plants for the entire project site. Vascular plants need to be identified to a taxonomic level which allows rarity to be determined.

4. Report results of botanical field inventories that include:

   a. a description of the biological setting, including plant community, topography, soils, potential habitat of target species, and an evaluation of environmental conditions, such as timing or quantity of rainfall, which may influence the performance and expression of target species

   b. a map of project location showing scale, orientation, project boundaries, parcel size, and map quadrangle name

   c. survey dates and survey methodology(ies)

   d. if a reference population is available, provide a written narrative describing the target species reference population(s) used, and date(s) when observations were made

   e. a comprehensive list of all vascular plants occurring on the project site for each habitat type

   f. current and historic land uses of the habitat(s) and degree of site alteration

   g. presence of target species off-site on adjacent parcels, if known

   h. an assessment of the biological significance or ecological quality of the project site in a local and regional context

5. If target species is(are) found, report results that additionally include:

a. a map showing federally listed, proposed and candidate species distribution as they relate to the proposed project

b. if target species is (are) associated with wetlands, a description of the direction and integrity of flow of surface hydrology. If target species is (are) affected by adjacent off-site hydrological influences, describe these factors.

c. the target species phenology and microhabitat, an estimate of the number of individuals of each target species per unit area; identify areas of high, medium and low density of target species over the project site, and provide acres of occupied habitat of target species. Investigators could provide color slides, photos or color copies of photos of target species or representative habitats to support information or descriptions contained in reports.

d. the degree of impact(s), if any, of the proposed project as it relates to the potential unoccupied habitat of target habitat.

6. Document findings of target species by completing California Native Species Field Survey Form(s) and submit form(s) to the Natural Diversity Data Base. Documentation of determinations and/or voucher specimens may be useful in cases of taxonomic ambiguities, habitat or range extensions.

7. Report as an addendum to the original survey, any change in abundance and distribution of target plants in subsequent years. Project sites with inventories older than 3 years from the current date of project proposal submission will likely need additional survey. Investigators need to assess whether an additional survey(s) is (are) needed.

8. Adverse conditions may prevent investigator(s) from determining presence or identifying some target species in potential habitat(s) of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any year. An additional botanical inventory(ies) in a subsequent year(s) may be required if adverse conditions occur in a potential habitat(s). Investigator(s) may need to discuss such conditions.

9. Guidance from California Department of Fish and Game (CDFG) regarding plant and plant community surveys can be found in Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities, 1984. Please contact the CDFG Regional Office for questions regarding the CDFG guidelines and for assistance in determining any applicable State regulatory requirements.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Field Office
2730 Loker Avenue West
Carlsbad, California 92008

NAF El Centro
Listed Endangered, Threatened, and Sensitive Species

Common Name	Scientific Name	Status
Listed Species		
BIRDS		
peregrine falcon	Falco peregrinus	E
southwestern willow flycatcher	Empidonax traillii extimus	E
FISH		
desert pupfish	Cyprinodon macularius	E
Proposed Species		
PLANTS		
Peirson's milkvetch	Astragalus magdalenae var. peirsonii	PE

E: Endangered
T: Threatened
PE: Proposed Endangered
PT: Proposed Threatened
C: Candidate for listing

Appendix C. Socioeconomics

APPENDIX C
SOCIOECONOMICS

C.1 OVERVIEW

The assessment of socioeconomic impacts resulting from Navy actions can be one of the most controversial issues related to the realignment, closure or modification of an installation. The economic and social well-being of a community can be dependent upon the activities of the installation, and disruptions to the status quo become politically charged and emotion-laden. The objective of a socioeconomic analysis of Navy actions is an open, realistic, and documented assessment of the potential effects.

The requirement to assess socioeconomic impacts in EAs or EISs has been a source of legal discussion since the passage of the National Environmental Policy Act (NEPA). While NEPA is predominately oriented toward the biophysical environment, court decisions have supported the need for analysis of socioeconomic impacts when they are accompanied by biophysical impacts.

C.2 ECONOMIC IMPACT FORECAST SYSTEM (EIFS)

The US Army developed the Economic Impact Forecast System (EIFS) with the assistance of many academic and professional economists and regional scientists to address economic impacts and to measure their significance. As a result of its applicability and in the interest of uniformity, EIFS is mandated by ASA (IL&E) for use in NEPA assessment for base realignments and closure. The entire system is designed for the scrutiny of a populace affected by the actions being studied. The algorithms in EIFS are simple and easy to understand but still have firm, defensible bases in regional economic theory.

EIFS is included as one of the tools of the Environmental Technical Information System (ETIS) and is implemented as an on-line service supported by USACERL through the University of Illinois. The system is available to anyone with an

approved login and password and is available at all times through toll-free numbers, Telnet, and other commonly-used communications. The ETIS Support Center at the university and the staff of USACERL are available to assist with the use of EIFS.

The data bases in EIFS are national in scope and cover the approximately 3,700 counties, parishes and independent cities recognized by federal agencies as reporting units. EIFS allows the user to define an economic region of influence (ROI) by simply identifying the counties that are to be analyzed. Once the ROI is defined, the system aggregates the data, calculates multipliers and other variables used in the various models in EIFS, and prompts the user for input data.

C.3 THE EIFS IMPACT MODELS

The basis of the EIFS analytical capabilities is the calculation of multipliers that are used to estimate the impacts resulting from Navy-related changes in local expenditures and/or employment. In calculating the multipliers, EIFS uses the economic base model approach that relies on the ratio of total economic activity to basic economic activity. Basic, in this context, is defined as the production or employment to supply goods and services outside the ROI or by federal activities (such as military installations and their employees). According to economic base theory, the ratio of total income to basic income is measurable (as the multiplier) and sufficiently stable so that future changes in economic activity can be forecast. This technique is especially appropriate for estimating aggregate impacts and makes the economic base model ideal for the EA/EIS process.

The multiplier is interpreted as the total impact on the economy of the region resulting from a unit change in its basic sector for example, a dollar increase in local expenditures due to an expansion of its military installation. EIFS estimates its multipliers using a location quotient approach based on the concentration of industries within the region relative to the concentration of industries in the nation.

EIFS has models for three basic military activity scenarios: standard, construction, and training. The user selects a model to be used and inputs those data elements into the selected model that describe the Army action: civilian and military to be moved and their salaries and the local procurement associated with the activity being relocated. Once these are entered into the system, a projection of changes in the local economy is provided. These are projected changes in sales volume, employment, income, and population. These four indicator variables are used to measure and evaluate socioeconomic impacts.

C.4 THE EVALUATION OF SOCIOECONOMIC IMPACTS

Under NEPA, there are no established thresholds in determining whether a socioeconomic impact is significant or not. Once model projections are obtained, the Rational Threshold Value (RTV) profile allows the reader to evaluate the context and

intensity of the impacts. This analytical tool reviews the historical trends for the defined region and develops measures of local historical fluctuations in sales volume, employment, income, and population. These evaluations indicate the intensity of the positive and negative changes of a project.

The RTV provides boundaries (threshold values) to assess the magnitude of an action's impacts. The largest historical change (both increase and decrease) maps out the boundaries. These values provide a basis for comparing an action's impact to the historical fluctuation in a particular area. Therefore, the assignment of thresholds is made on an individual basis. Specifically, EIFS sets the boundaries by multiplying the maximum historical deviation of:

		Increase	Decrease
Business volume	x	100%	75%
Personal income	x	100%	67%
Total employment	x	100%	67%
Total population	x	100%	50%

The percentage allowances are arbitrary but sensible. The maximum positive historical fluctuation is expressed with expansion because of the positive connotations of economic growth. While cases of damaging economic growth have been cited and although the zero-growth concept is being accepted by many local planning groups, the effects of reductions and closures generally are much more controversial than expansions.

The major strengths of the RTV criteria is that it is specific to the region under analysis and it is based on actual historical time series data for the defined region. The use of EIFS impact models in combination with the RTV has proven very successful in addressing perceived socioeconomic impacts. The EIFS model and the RTV technique for measuring significance are theoretically sound and have been reviewed on numerous occasions.

The severity of conceivable impacts accelerates in the following order: total business volume, total personal income, total employment, and total population. Business volume impacts may be alleviated by manipulation of such variables as inventory and new equipment. Impacts on workers or proprietors are not easily or immediately assessed. Changes in employment and income are of primary interest. Employment and income impacts are followed by changes in personal income, directly affecting individuals within the region. Population threshold indicators are extremely important because they reflect the effects on local government revenues, housing, education, infrastructure, and other social services. They should be weighted accordingly.

The following pages contain the EIFS input and output data for the proposed realignment action. This data forms the basis for the socioeconomic impact analysis presented in Section 4.4.

This page intentionally left blank.

EIFS Model Results for NAWS Point Mugu

RATIONAL THRESHOLD VALUES
NAWS Mugu
Ventura County

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

POPULATION

YEAR	Population	change	deviation	%deviation
1969	369,800			
1970	381,200	11,400	-2,374	-0.642 %
1971	395,700	14,500	726	0.190 %
1972	408,500	12,800	-974	-0.246 %
1973	419,500	11,000	-2,774	-0.679 %
1974	433,900	14,400	626	0.149 %
1975	448,900	15,000	1,226	0.283 %
1976	460,500	11,600	-2,174	-0.484 %
1977	478,700	18,200	4,426	0.961 %
1978	494,100	15,400	1,626	0.340 %
1979	512,200	18,100	4,326	0.876 %
1980	532,700	20,500	6,726	1.313 %
1981	544,700	12,000	-1,774	-0.333 %
1982	559,100	14,400	626	0.115 %
1983	571,500	12,400	-1,374	-0.246 %
1984	583,200	11,700	-2,074	-0.363 %
1985	595,600	12,400	-1,374	-0.236 %
1986	606,700	11,100	-2,674	-0.449 %
1987	621,600	14,900	1,126	0.186 %
1988	638,500	16,900	3,126	0.503 %
1989	656,300	17,800	4,026	0.631 %
1990	670,200	13,900	126	0.019 %
1991	676,800	6,600	-7,174	-1.070 %
1992	686,600	9,800	-3,974	-0.587 %

average yearly change:	13,774
maximum historic positive deviation:	6,726
maximum historic negative deviation:	-7,174
maximum historic % positive deviation:	1.313 %
maximum historic % negative deviation:	-1.070 %
positive rtv:	1.313 %
negative rtv:	-0.535 %

RATIONAL THRESHOLD VALUES
NAWS Mugu
Ventura County

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

EMPLOYMENT

YEAR	Employment	change	deviation	%deviation
1969	133,463			
1970	134,567	1,104	-7,556	-5.661 %
1971	139,190	4,623	-4,037	-3.000 %
1972	146,582	7,392	-1,268	-0.911 %
1973	154,660	8,078	-582	-0.397 %
1974	163,615	8,955	295	0.191 %
1975	170,741	7,126	-1,534	-0.938 %
1976	175,312	4,571	-4,089	-2.395 %
1977	187,231	11,919	3,259	1.859 %
1978	202,251	15,020	6,360	3.397 %
1979	212,431	10,180	1,520	0.752 %
1980	219,778	7,347	-1,313	-0.618 %
1981	225,242	5,464	-3,196	-1.454 %
1982	230,219	4,977	-3,683	-1.635 %
1983	236,821	6,602	-2,058	-0.894 %
1984	249,289	12,468	3,808	1.608 %
1985	261,866	12,577	3,917	1.571 %
1986	272,055	10,189	1,529	0.584 %
1987	287,856	15,801	7,141	2.625 %
1988	306,656	18,800	10,140	3.523 %
1989	319,790	13,134	4,474	1.459 %
1990	331,203	11,413	2,753	0.861 %
1991	330,242	-961	-9,621	-2.905 %
1992	332,643	2,401	-6,259	-1.895 %

average yearly change:	8,660	
maximum historic positive deviation:	10,140	
maximum historic negative deviation:	-9,621	
maximum historic % positive deviation:	3.523	%
maximum historic % negative deviation:	-5.661	%
positive rtv:	3.523	%
negative rtv:	-3.793	%

RATIONAL THRESHOLD VALUES
NAWS Mugu
Ventura County

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

BUSINESS VOLUME (using Non-Farm Income)

YEAR	Non-Farm income	adjusted income	change	deviation	%deviation
1969	853,779	2,525,973			
1970	913,116	2,550,603	24,630	-167,905	-6.647 %
1971	988,400	2,649,866	99,263	-93,273	-3.657 %
1972	1,108,447	2,871,624	221,758	29,223	1.103 %
1973	1,233,495	3,008,524	136,900	-55,635	-1.937 %
1974	1,377,577	3,027,642	19,117	-173,418	-5.764 %
1975	1,549,243	3,117,189	89,547	-102,988	-3.402 %
1976	1,743,797	3,321,518	204,329	11,794	0.378 %
1977	2,002,540	3,582,361	260,843	68,308	2.057 %
1978	2,339,127	3,885,593	303,232	110,696	3.090 %
1979	2,644,495	3,947,007	61,414	-131,121	-3.375 %
1980	2,967,470	3,899,435	-47,572	-240,108	-6.083 %
1981	3,303,070	3,936,913	37,478	-155,057	-3.976 %
1982	3,596,347	4,045,385	108,472	-84,064	-2.135 %
1983	3,942,445	4,303,979	258,595	66,059	1.633 %
1984	4,459,672	4,704,295	400,316	207,780	4.828 %
1985	4,966,013	5,062,195	357,900	165,364	3.515 %
1986	5,477,171	5,675,825	613,630	421,095	8.318 %
1987	6,064,003	6,064,003	388,178	195,643	3.447 %
1988	6,689,648	6,432,354	368,351	175,815	2.899 %
1989	7,205,970	6,610,982	178,628	-13,908	-0.216 %
1990	7,842,241	6,837,176	226,195	33,659	0.509 %
1991	8,094,928	6,779,672	-57,505	-250,040	-3.657 %
1992	8,539,865	6,954,287	174,616	-17,920	-0.264 %

average yearly change:	192,535
maximum historic positive deviation:	421,095
maximum historic negative deviation:	-250,040
maximum historic % positive deviation:	8.318 %
maximum historic % negative deviation:	-6.647 %
positive rtv:	8.318 %
negative rtv:	-4.985 %

RATIONAL THRESHOLD VALUES
NAWS Mugu
Ventura County

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1967=100).

PERSONAL INCOME

YEAR	Personal income	adjusted income	change	deviation	%deviation
1969	1,491,347	4,412,269			
1970	1,586,044	4,430,291	18,021	-324,357	-7.351 %
1971	1,738,986	4,662,161	231,870	-110,508	-2.494 %
1972	1,955,590	5,066,296	404,135	61,756	1.325 %
1973	2,233,422	5,447,371	381,075	38,697	0.764 %
1974	2,552,139	5,609,097	161,726	-180,653	-3.316 %
1975	2,888,480	5,811,831	202,734	-139,644	-2.490 %
1976	3,252,695	6,195,610	383,779	41,400	0.712 %
1977	3,763,253	6,732,116	536,507	194,128	3.133 %
1978	4,480,083	7,441,998	709,882	367,504	5.459 %
1979	5,103,432	7,617,063	175,064	-167,314	-2.248 %
1980	5,930,896	7,793,556	176,493	-165,885	-2.178 %
1981	6,741,670	8,035,363	241,807	-100,571	-1.290 %
1982	7,313,754	8,226,945	191,581	-150,797	-1.877 %
1983	7,880,304	8,602,952	376,007	33,629	0.409 %
1984	8,782,074	9,263,791	660,839	318,460	3.702 %
1985	9,574,866	9,760,312	496,521	154,143	1.664 %
1986	10,487,590	10,867,969	1,107,657	765,278	7.841 %
1987	11,398,630	11,398,630	530,661	188,283	1.732 %
1988	12,356,717	11,881,459	482,829	140,450	1.232 %
1989	13,279,914	12,183,407	301,949	-40,430	-0.340 %
1990	14,162,477	12,347,408	164,001	-178,378	-1.464 %
1991	14,450,673	12,102,741	-244,667	-587,046	-4.754 %
1992	15,088,406	12,286,975	184,234	-158,144	-1.307 %

average yearly change:	342,379
maximum historic positive deviation:	765,278
maximum historic negative deviation:	-587,046
maximum historic % positive deviation:	7.841 %
maximum historic % negative deviation:	-7.351 %
positive rtv:	7.841 %
negative rtv:	-4.925 %

STANDARD EIFS FORECAST MODEL

Project name: E-2 Realignment to NAWS Point Mugu (1998)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Change in expenditures for services and supplies: $700,150 (Annual procurement of $1,400,300 for a half year)
Change in expenditures for local services and supplies: $445,380.75 (calculated)

Change in civilian employment: 12 (Half the 48 civilian personnel for half a year, assuming immediate ramp-up in July 1998)
Average income of affected civilian personnel: $37,932
Percent expected to relocate: (0.0) 83.3 percent (20 are assumed to relocate; the other 4 would be hired at the local economy level)

Change in military employment: 237 (Half of the 948 military personnel for half a year, assuming immediate ramp-up in July 1998)
Average income of affected military personnel: $27,331
Percent of military living on the base: 33.0 percent (The unaccompanied personnel who are assumed to live in BOQ/BEQ)

STANDARD EIFS MODEL FORECAST FOR E-2 Realignment to NAWS Point Mugu (1998)

Export income multiplier:		2.7482	
Change in local			
Sales volume	Direct:	$3,265,000	
	Induced:	$5,708,000	
	Total:	$8,973,000	(0.053%)
Employment	Direct:	21	
	Total:	306	(0.106%)
Income	Direct:	$406,000	
	Total (place of work):	$8,048,000	
	Total (place of residence):	$8,048,000	(0.056%)
Local population	:	619	(0.100%)
Local off-base population	:	425	
Number of school children	:	104	
Demand for housing	Rental:	105	
	Owner occupied:	64	
Government expenditures.....	:	$779,000	
Government revenues	:	$1,027,000	
Net Government revenues	:	$248,000	
Civilian employees expected to relocate:		10	
Military employees expected to relocate:		237	

STANDARD EIFS FORECAST MODEL

Project name: E-2 Realignment to NAWS Point Mugu (1999)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Change in expenditures for services and supplies: $1,400,300
Change in expenditures for local services and supplies: $890,761.50 (calculated)

Change in civilian employment: 48 (Assuming immediate ramp-up of remaining E-2 personnel in January 1999)
Average income of affected civilian personnel: $37,932
Percent expected to relocate: (0.0) 83.3 percent (20 are assumed to relocate; the other 4 would be hired at the local economy level

Change in military employment: 948 (Assuming immediate ramp-up of remaining E-2 personnel in January 1999)
Average income of affected military personnel: $27,331
Percent of military living on the base: 33.0 percent

STANDARD EIFS MODEL FORECAST FOR E-2 Realignment to NAWS Point Mugu (1999)

Export income multiplier:		2.7482	
Change in local			
Sales volume	Direct:	$12,170,000	
	Induced:	$21,275,000	
	Total:	$33,445,000	(0.197%)
Employment	Direct:	78	
	Total:	1,210	(0.420%)
Income	Direct:	$1,512,000	
	Total (place of work):	$31,886,000	
	Total (place of residence):	$31,886,000	(0.221%)
Local population	:	2,478	(0.399%)
Local off-base population	:	1,699	
Number of school children	:	417	
Demand for housing	Rental:	420	
	Owner occupied:	255	
Government expenditures.....	:	$3,090,000	
Government revenues	:	$4,085,000	
Net Government revenues	:	$996,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		948	

STANDARD EIFS FORECAST MODEL

Project name: E-2 Realignment to NAWS Mugu (2000)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Change in expenditures for services and supplies: $1,400,300
Change in expenditures for local services and supplies: $890,761.50 (calculated)

Change in civilian employment: 48
Average income of affected civilian personnel: $37,932
Percent expected to relocate: (0.0) 83.3 percent

Change in military employment: 948
Average income of affected military personnel: $27,331
Percent of military living on the base: 33.0 percent

STANDARD EIFS MODEL FORECAST FOR E-2 Realignment to NAWS Mugu (2000)

Export income multiplier:		2.7482	
Change in local			
Sales volume	Direct:	$12,170,000	
	Induced:	$21,275,000	
	Total:	$33,445,000	(0.197%)
Employment	Direct:	78	
	Total:	1,210	(0.420%)
Income	Direct:	$1,512,000	
	Total (place of work):	$31,886,000	
	Total (place of residence):	$31,886,000	(0.221%)
Local population		2,478	(0.399%)
Local off-base population		1,699	
Number of school children		417	
Demand for housing	Rental:	420	
	Owner occupied:	255	
Government expenditures.....		$3,090,000	
Government revenues		$4,085,000	
Net Government revenues		$996,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		948	

STANDARD EIFS FORECAST MODEL

Project name: E-2 Realignment to NAWS Point Mugu (2001)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Change in expenditures for services and supplies: $1,400,300
Change in expenditures for local services and supplies: $890,761.50 (calculated)

Change in civilian employment: 48
Average income of affected civilian personnel: $37,932
Percent expected to relocate: (0.0) 83.3 percent

Change in military employment: 948
Average income of affected military personnel: $27,331
Percent of military living on the base: 33.0 percent

STANDARD EIFS MODEL FORECAST FOR E-2 Realignment to NAWS Point Mugu (2001)

Export income multiplier:		2.7482	
Change in local			
Sales volume	Direct:	$12,170,000	
	Induced:	$21,275,000	
	Total:	$33,445,000	(0.197%)
Employment	Direct:	78	
	Total:	1,210	(0.420%)
Income	Direct:	$1,512,000	
	Total (place of work):	$31,886,000	
	Total (place of residence):	$31,886,000	(0.221%)
Local population		2,478	(0.399%)
Local off-base population		1,699	
Number of school children		417	
Demand for housing	Rental:	420	
	Owner occupied:	255	
Government expenditures.....		$3,090,000	
Government revenues		$4,085,000	
Net Government revenues		$996,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		948	

CONSTRUCTION

Project name: E-2 Realignment to NAWS Point Mugu (1998)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $10,156,000
Local expenditures of project: $6,460,453.90 (calculated)
Percent for labor: (34.2)
Percent for materials: (57.8)
Percent allowed for other: 8.00 (calculated)
Percent of construction workers expected to migrate into the area: (30.0)

CONSTRUCTION IMPACT FORECAST FOR E-2 Realignment to NAWS Point Mugu (1998)

Export income multiplier:		2.7482	
Change in local			
Sales volume	Direct:	$5,511,000	
	Induced:	$9,633,000	
	Total:	$15,144,000	(0.087%)
Employment	Direct:	34	
	Total:	161	(0.056%)
Income	Direct:	$670,000	
	Total (place of work):	$4,203,000	
	Total (place of residence):	$4,203,000	(0.029%)
Local population		45	(0.007%)
Local off-base population		45	
Number of school children		8	
Demand for housing	Rental:	20	
	Owner occupied:	0	
Government expenditures.....		$324,000	
Government revenues		$338,000	
Net Government revenues		$13,000	
Civilian employees expected to relocate:		20	
Military employees expected to relocate:		0	

CONSTRUCTION

Project name: E-2 Realignment to NAWS Point Mugu (1999)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $15,696,000
Local expenditures of project: $9,984,569.17 (calculated)
Percent for labor: (34.2)
Percent for materials: (57.8)
Percent allowed for other: 8.00 (calculated)
Percent of construction workers expected to migrate into the area: (30.0)

CONSTRUCTION IMPACT FORECAST FOR E-2 Realignment to NAWS Point Mugu (1999)

Export income multiplier:		2.7482	
Change in local			
Sales volume	Direct:	$8,517,000	
	Induced:	$14,888,000	
	Total:	$23,405,000	(0.135%)
Employment	Direct:	53	
	Total:	249	(0.086%)
Income	Direct:	$1,036,000	
	Total (place of work):	$6,496,000	
	Total (place of residence):	$6,496,000	(0.045%)
Local population .....:		70	(0.011%)
Local off-base population .....:		70	
Number of school children .....:		12	
Demand for housing	Rental:	31	
	Owner occupied:	0	
Government expenditures.....:		$501,000	
Government revenues .....:		$522,000	
Net Government revenues .....:		$20,000	
Civilian employees expected to relocate:		31	
Military employees expected to relocate:		0	

CONSTRUCTION

Project name: E-2 Realignment to NAWS Point Mugu (2000)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $2,770,000
Local expenditures of project: $1,762,057.63 (calculated)
Percent for labor: (34.2)
Percent for materials: (57.8)
Percent allowed for other: 8.00 (calculated)
Percent of construction workers expected to migrate into the area: (30.0)

CONSTRUCTION IMPACT FORECAST FOR E-2 Realignment to NAWS Point Mugu (2000)

Export income multiplier:		2.7482	
Change in local			
Sales volume	Direct:	$1,503,000	
	Induced:	$2,627,000	
	Total:	$4,130,000	(0.024%)
Employment	Direct:	9	
	Total:	44	(0.015%)
Income	Direct:	$183,000	
	Total (place of work):	$1,146,000	
	Total (place of residence):	$1,146,000	(0.008%)
Local population		12	(0.002%)
Local off-base population		12	
Number of school children		2	
Demand for housing	Rental:	5	
	Owner occupied:	0	
Government expenditures.....		$88,000	
Government revenues		$92,000	
Net Government revenues		$4,000	
Civilian employees expected to relocate:		5	
Military employees expected to relocate:		0	

This page intentionally left blank.

EIFS Model Results for NAS Lemoore

RATIONAL THRESHOLD VALUES
NAS Lemoore
Kings and Fresno Counties (aggregated)

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

POPULATION

YEAR	Population	change	deviation	%deviation
1969	473,900			
1970	481,500	7,600	-7,143	-1.507 %
1971	491,200	9,700	-5,043	-1.047 %
1972	500,100	8,900	-5,843	-1.190 %
1973	508,200	8,100	-6,643	-1.328 %
1974	519,000	10,800	-3,943	-0.776 %
1975	534,800	15,800	1,057	0.204 %
1976	548,900	14,100	-643	-0.120 %
1977	561,500	12,600	-2,143	-0.391 %
1978	571,200	9,700	-5,043	-0.898 %
1979	579,900	8,700	-6,043	-1.058 %
1980	591,500	11,600	-3,143	-0.542 %
1981	606,100	14,600	-143	-0.024 %
1982	622,100	16,000	1,257	0.207 %
1983	640,400	18,300	3,557	0.572 %
1984	659,100	18,700	3,957	0.618 %
1985	674,600	15,500	757	0.115 %
1986	686,600	12,000	-2,743	-0.407 %
1987	705,100	18,500	3,757	0.547 %
1988	730,500	25,400	10,657	1.511 %
1989	752,700	22,200	7,457	1.021 %
1990	773,700	21,000	6,257	0.831 %
1991	795,000	21,300	6,557	0.847 %
1992	813,000	18,000	3,257	0.410 %

average yearly change:	14,743
maximum historic positive deviation:	10,657
maximum historic negative deviation:	-7,143
maximum historic % positive deviation:	1.511 %
maximum historic % negative deviation:	-1.507 %
positive rtv:	1.511 %
negative rtv:	-0.754 %

RATIONAL THRESHOLD VALUES
NAS Lemoore
Kings and Fresno Counties (aggregated)

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

EMPLOYMENT

YEAR	Employment	change	deviation	%deviation
1969	202,756			
1970	207,326	4,570	-3,482	-1.717 %
1971	213,273	5,947	-2,105	-1.015 %
1972	225,804	12,531	4,479	2.100 %
1973	235,285	9,481	1,429	0.633 %
1974	246,823	11,538	3,486	1.482 %
1975	253,391	6,568	-1,484	-0.601 %
1976	261,720	8,329	277	0.110 %
1977	270,839	9,119	1,067	0.408 %
1978	282,692	11,853	3,801	1.404 %
1979	301,522	18,830	10,778	3.813 %
1980	308,427	6,905	-1,147	-0.380 %
1981	311,674	3,247	-4,805	-1.558 %
1982	313,260	1,586	-6,466	-2.074 %
1983	321,133	7,873	-179	-0.057 %
1984	328,264	7,131	-921	-0.287 %
1985	331,832	3,568	-4,484	-1.366 %
1986	334,838	3,006	-5,046	-1.521 %
1987	346,463	11,625	3,573	1.067 %
1988	361,091	14,628	6,576	1.898 %
1989	372,667	11,576	3,524	0.976 %
1990	386,894	14,227	6,175	1.657 %
1991	389,311	2,417	-5,635	-1.456 %
1992	387,941	-1,370	-9,422	-2.420 %

average yearly change:	8,052
maximum historic positive deviation:	10,778
maximum historic negative deviation:	-9,422
maximum historic % positive deviation:	3.813 %
maximum historic % negative deviation:	-2.420 %
positive rtv:	3.813 %
negative rtv:	-1.621 %

RATIONAL THRESHOLD VALUES
NAS Lemoore
Kings and Fresno Counties (aggregated)

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

BUSINESS VOLUME (using Non-Farm Income)

YEAR	Non-Farm income	adjusted income	change	deviation	%deviation
1969	1,117,431	3,306,009			
1970	1,205,517	3,367,366	61,357	-95,374	-2.885 %
1971	1,322,519	3,545,627	178,261	21,530	0.639 %
1972	1,486,422	3,850,834	305,207	148,476	4.188 %
1973	1,676,472	4,088,956	238,122	81,390	2.114 %
1974	1,880,283	4,132,490	43,534	-113,197	-2.768 %
1975	2,084,751	4,194,670	62,180	-94,552	-2.288 %
1976	2,354,448	4,484,663	289,993	133,261	3.177 %
1977	2,631,046	4,706,701	222,038	65,307	1.456 %
1978	3,008,945	4,998,247	291,546	134,815	2.864 %
1979	3,464,338	5,170,654	172,406	15,675	0.314 %
1980	3,777,357	4,963,676	-206,978	-363,710	-7.034 %
1981	4,052,859	4,830,583	-133,093	-289,824	-5.839 %
1982	4,197,224	4,721,287	-109,296	-266,027	-5.507 %
1983	4,511,902	4,925,657	204,371	47,639	1.009 %
1984	4,916,035	5,185,691	260,033	103,302	2.097 %
1985	5,215,622	5,316,638	130,947	-25,784	-0.497 %
1986	5,521,963	5,722,241	405,603	248,872	4.681 %
1987	6,033,555	6,033,555	311,314	154,582	2.701 %
1988	6,492,620	6,242,904	209,349	52,617	0.872 %
1989	7,112,777	6,525,483	282,580	125,848	2.016 %
1990	7,835,348	6,831,167	305,683	148,952	2.283 %
1991	8,212,027	6,877,744	46,578	-110,154	-1.613 %
1992	8,486,501	6,910,831	33,087	-123,645	-1.798 %

average yearly change:	156,731
maximum historic positive deviation:	248,872
maximum historic negative deviation:	-363,710
maximum historic % positive deviation:	4.681 %
maximum historic % negative deviation:	-7.034 %
positive rtv:	4.681 %
negative rtv:	-5.276 %

RATIONAL THRESHOLD VALUES
NAS Lemoore
Kings and Fresno Counties (aggregated)

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

PERSONAL INCOME

YEAR	Personal income	adjusted income	change	deviation	%deviation
1969	1,668,472	4,936,308			
1970	1,834,571	5,124,500	188,192	-63,443	-1.285 %
1971	1,979,113	5,305,933	181,433	-70,203	-1.370 %
1972	2,223,148	5,759,451	453,518	201,882	3.805 %
1973	2,545,547	6,208,651	449,200	197,565	3.430 %
1974	3,040,132	6,681,609	472,958	221,322	3.565 %
1975	3,233,169	6,505,370	-176,239	-427,874	-6.404 %
1976	3,785,360	7,210,210	704,839	453,204	6.967 %
1977	4,005,609	7,165,669	-44,541	-296,176	-4.108 %
1978	4,399,184	7,307,615	141,946	-109,690	-1.531 %
1979	5,352,613	7,988,975	681,360	429,725	5.881 %
1980	6,265,749	8,233,573	244,598	-7,037	-0.088 %
1981	6,429,576	7,663,380	-570,193	-821,829	-9.981 %
1982	6,749,976	7,592,774	-70,606	-322,242	-4.205 %
1983	6,887,462	7,519,063	-73,710	-325,346	-4.285 %
1984	7,736,451	8,160,813	641,750	390,114	5.188 %
1985	8,292,046	8,452,646	291,833	40,198	0.493 %
1986	8,800,766	9,119,965	667,318	415,683	4.918 %
1987	9,642,581	9,642,581	522,616	270,981	2.971 %
1988	10,211,036	9,818,304	175,723	-75,913	-0.787 %
1989	11,163,668	10,241,897	423,593	171,958	1.751 %
1990	12,150,402	10,593,202	351,304	99,669	0.973 %
1991	12,457,405	10,433,337	-159,864	-411,500	-3.885 %
1992	13,168,980	10,723,925	290,587	38,952	0.373 %

average yearly change:	251,636
maximum historic positive deviation:	453,204
maximum historic negative deviation:	-821,829
maximum historic % positive deviation:	6.967 %
maximum historic % negative deviation:	-9.981 %
positive rtv:	6.967 %
negative rtv:	-6.688 %

STANDARD EIFS FORECAST MODEL

Project name: E-2 Realignment to NAS Lemoore (1998)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Change in expenditures for services and supplies: $700,150 (Annual procurement of $1,400,300 for a half year)
Change in expenditures for local services and supplies: $428,594.28 (calculated)

Change in civilian employment: 10 (Half the 40 civilian personnel for half a year, assuming immediate ramp-up in July 1998)
Average income of affected civilian personnel: $30,861
Percent expected to relocate: (0.0) 100.0 percent (20 are assumed to relocate)
Change in military employment: 237 (Half of the 948 military personnel for half a year, assuming immediate ramp-up in July 1998)
Average income of affected military personnel: $37,230
Percent of military living on the base: 33.0 percent (The unaccompanied personnel are assumed to live in BOQ/BEQ)

STANDARD EIFS MODEL FORECAST FOR E-2 Realignment to NAS Lemoore (1998)

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$4,040,000	
	Induced:	$6,377,000	
	Total:	$10,417,000	(0.077%)
Employment	Direct:	31	
	Total:	328	(0.095%)
Income	Direct:	$578,000	
	Total (place of work):	$10,622,000	
	Total (place of residence):	$10,530,000	(0.086%)
Local population .....:		619	(0.088%)
Local off-base population .....:		424	
Number of school children .....:		104	
Demand for housing	Rental:	106	
	Owner occupied:	63	
Government expenditures.....:		$959,000	
Government revenues .....:		$1,570,000	
Net Government revenues .....:		$610,000	
Civilian employees expected to relocate:		10	
Military employees expected to relocate:		237	

STANDARD EIFS FORECAST MODEL

Project name: E-2 Realignment to NAS Lemoore (1999)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Change in expenditures for services and supplies: $1,400,300
Change in expenditures for local services and supplies: $857,188.56 (calculated)

Change in civilian employment: 40 (Assuming immediate ramp-up of remaining E-2 personnel in January 1999)
Average income of affected civilian personnel: $30,861
Percent expected to relocate: (0.0) 100.0 percent (20 are assumed to relocate)
Change in military employment: 948 (Assuming immediate ramp-up of remaining E-2 personnel in January 1999)
Average income of affected military personnel: $37,230
Percent of military living on the base: 33.0 percent

STANDARD EIFS MODEL FORECAST FOR E-2 Realignment to NAS Lemoore (1999)

Export income multiplier: 2.5783

Change in local

Sales volume	Direct:	$15,304,000	
	Induced:	$24,154,000	
	Total:	$39,458,000	(0.292%)
Employment	Direct:	119	
	Total:	1,294	(0.373%)
Income	Direct:	$2,188,000	
	Total (place of work):	$42,171,000	
	Total (place of residence):	$41,809,000	(0.343%)
Local population		2,476	(0.351%)
Local off-base population		1,697	
Number of school children		416	
Demand for housing	Rental:	425	
	Owner occupied:	250	
Government expenditures.....		$3,805,000	
Government revenues		$6,253,000	
Net Government revenues		$2,448,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		948	

STANDARD EIFS FORECAST MODEL

Project name: E-2 Realignment to NAS Lemoore (2000)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Change in expenditures for services and supplies: $1,400,300
Change in expenditures for local services and supplies: $857,188.56 (calculated)

Change in civilian employment: 40
Average income of affected civilian personnel: $30,861
Percent expected to relocate: (0.0) 100.0 percent
Change in military employment: 948
Average income of affected military personnel: $37,230
Percent of military living on the base: 33.0 percent

STANDARD EIFS MODEL FORECAST FOR E-2 Realignment to NAS Lemoore (2000)

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$15,304,000	
	Induced:	$24,154,000	
	Total:	$39,458,000	(0.292%)
Employment	Direct:	119	
	Total:	1,294	(0.373%)
Income	Direct:	$2,188,000	
	Total (place of work):	$42,171,000	
	Total (place of residence):	$41,809,000	(0.343%)
Local population		2,476	(0.351%)
Local off-base population		1,697	
Number of school children		416	
Demand for housing	Rental:	425	
	Owner occupied:	250	
Government expenditures.....		$3,805,000	
Government revenues		$6,253,000	
Net Government revenues		$2,448,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		948	

STANDARD EIFS FORECAST MODEL

Project name: E-2 Realignment to NAS Lemoore (2001)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Change in expenditures for services and supplies: $1,400,300
Change in expenditures for local services and supplies: $857,188.56 (calculated)

Change in civilian employment: 40
Average income of affected civilian personnel: $30,861
Percent expected to relocate: (0.0) 100.0 percent
t
Change in military employment: 948
Average income of affected military personnel: $37,230
Percent of military living on the base: 33.0 percent

STANDARD EIFS MODEL FORECAST FOR E-2 Realignment to NAS Lemoore (2001)

Export income multiplier: 2.5783

Change in local			
Sales volume	Direct:	$15,304,000	
	Induced:	$24,154,000	
	Total:	$39,458,000	(0.292%)
Employment	Direct:	119	
	Total:	1,294	(0.373%)
Income	Direct:	$2,188,000	
	Total (place of work):	$42,171,000	
	Total (place of residence):	$41,809,000	(0.343%)
Local population		2,476	(0.351%)
Local off-base population		1,697	
Number of school children		416	
Demand for housing	Rental:	425	
	Owner occupied:	250	
Government expenditures.....		$3,805,000	
Government revenues		$6,253,000	
Net Government revenues		$2,448,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		948	

CONSTRUCTION

Project name: E-2 Realignment to NAS Lemoore (1998)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $22,625,000
Local expenditures of project: $13,849,811.29 (calculated)
Percent for labor: (34.2)
Percent for materials: (57.8)
Percent allowed for other: 8.00 (calculated)
Percent of construction workers expected to migrate into the area: (30.0)

CONSTRUCTION IMPACT FORECAST FOR E-2 Realignment to NAS Lemoore (1998)

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$11,813,000	
	Induced:	$18,645,000	
	Total:	$30,459,000	(0.220%)
Employment	Direct:	90	
	Total:	381	(0.110%)
Income	Direct:	$1,653,000	
	Total (place of work):	$9,324,000	
	Total (place of residence):	$9,274,000	(0.076%)
Local population		102	(0.014%)
Local off-base population		102	
Number of school children		18	
Demand for housing	Rental:	45	
	Owner occupied:	0	
Government expenditures.....		$898,000	
Government revenues		$936,000	
Net Government revenues		$37,000	
Civilian employees expected to relocate:		45	
Military employees expected to relocate:		0	

CONSTRUCTION

Project name: E-2 Realignment to NAS Lemoore (1999)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $31,383,000
Local expenditures of project: $19,210,989.07 (calculated)
Percent for labor: (34.2)
Percent for materials: (57.8)
Percent allowed for other: 8.00 (calculated)
Percent of construction workers expected to migrate into the area: (30.0)

CONSTRUCTION IMPACT FORECAST FOR E-2 Realignment to NAS Lemoore (1999)

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$16,386,000	
	Induced:	$25,862,000	
	Total:	$42,249,000	(0.306%)
Employment	Direct:	124	
	Total:	528	(0.152%)
Income	Direct:	$2,294,000	
	Total (place of work):	$12,934,000	
	Total (place of residence):	$12,864,000	(0.106%)
Local population		141	(0.020%)
Local off-base population		141	
Number of school children		25	
Demand for housing	Rental:	62	
	Owner occupied:	0	
Government expenditures.....		$1,246,000	
Government revenues		$1,298,000	
Net Government revenues		$52,000	
Civilian employees expected to relocate:		62	
Military employees expected to relocate:		0	

CONSTRUCTION

Project name: E-2 Realignment to NAS Lemoore (2000)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $4,379,000
Local expenditures of project: $2,680,588.89 (calculated)
Percent for labor: (34.2)
Percent for materials: (57.8)
Percent allowed for other: 8.00 (calculated)
Percent of construction workers expected to migrate into the area: (30.0)

CONSTRUCTION IMPACT FORECAST FOR E-2 Realignment to NAS Lemoore (2000)

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$2,286,000	
	Induced:	$3,609,000	
	Total:	$5,895,000	(0.043%)
Employment	Direct:	17	
	Total:	74	(0.021%)
Income	Direct:	$320,000	
	Total (place of work):	$1,805,000	
	Total (place of residence):	$1,795,000	(0.015%)
Local population		20	(0.003%)
Local off-base population		20	
Number of school children		3	
Demand for housing	Rental:	9	
	Owner occupied:	0	
Government expenditures.....		$174,000	
Government revenues		$181,000	
Net Government revenues		$7,000	
Civilian employees expected to relocate:		9	
Military employees expected to relocate:		0	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAS Lemoore (1998)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $700,150

Change in civilian employment: 10
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 100%
Change in military employment: 237
Average income of affected military personnel: $37,230
Percent of military living on the base: 33.0%

STANDARD EIPS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAS LEMOORE (1998)

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$4,312,000	
	Induced:	$6,805,000	
	Total:	$11,117,000	(0.082%)
Employment	Direct:	33	
	Total:	333	(0.096%)
Income	Direct:	$617,000	
	Total (place of work):	$10,722,000	
	Total (place of residence):	$10,629,000	(0.087%)
Local population .....:		619	(0.088%)
Local off-base population .....:		424	
Number of school children .....:		104	
Demand for housing	Rental:	106	
	Owner occupied:	63	
Government expenditures.....:		$969,000	
Government revenues .....:		$1,578,000	
Net Government revenues .....:		$609,000	
Civilian employees expected to relocate:		10	
Military employees expected to relocate:		237	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAS Lemoore (1999)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $857,189
Change in civilian employment: 40
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 100%
Change in military employment: 948
Average income of affected military personnel: $37,230
Percent of military living on the base: 33.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAS LEMOORE (1999)

Export income multiplier: 2.5783

Change in local			
Sales volume	Direct:	$15,304,000	
	Induced:	$24,154,000	
	Total:	$39,458,000	(0.292%)
Employment	Direct:	119	
	Total:	1,294	(0.373%)
Income	Direct:	$2,188,000	
	Total (place of work):	$42,171,000	
	Total (place of residence):	$41,809,000	(0.343%)
Local population	:	2,476	(0.351%)
Local off-base population	:	1,697	
Number of school children	:	416	
Demand for housing	Rental:	425	
	Owner occupied:	250	
Government expenditures.....	:	$3,805,000	
Government revenues	:	$6,253,000	
Net Government revenues	:	$2,448,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		948	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAS Lemoore (2000)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $964,689

Change in civilian employment: 160
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 25.0%
Change in military employment: 1,141
Average income of affected military personnel: $37,230
Percent of military living on the base: 34.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAS LEMOORE (2000)

Export income multiplier: 2.5783

Change in local

Sales volume	Direct:	$4,616,000	
	Induced:	$7,285,000	
	Total:	$11,901,000	(0.088%)
Employment	Direct:	36	
	Total:	253	(0.073%)
Income	Direct:	$660,000	
	Total (place of work):	$6,677,000	
	Total (place of residence):	$6,598,000	(0.054%)
Local population		118	(0.017%)
Local off-base population		117	
Number of school children		16	
Demand for housing	Rental:	19	
	Owner occupied:	22	
Government expenditures.....		$688,000	
Government revenues		$739,000	
Net Government revenues		$51,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		1	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAS Lemoore (2001)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $964,689

Change in civilian employment: 160
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 25.0%
Change in military employment: 1,713
Average income of affected military personnel: $37,230
Percent of military living on the base: 37.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAS LEMOORE (2001)

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$28,566,000	
	Induced:	$45,085,000	
	Total:	$73,651,000	(0.544%)
Employment	Direct:	222	
	Total:	2,444	(0.705%)
Income	Direct:	$4,085,000	
	Total (place of work):	$79,244,000	
	Total (place of residence):	$78,585,000	(0.645%)
Local population .....:		4,381	(0.621%)
Local off-base population .....:		2,803	
Number of school children .....:		739	
Demand for housing	Rental:	709	
	Owner occupied:	410	
Government expenditures.....:		$6,582,000	
Government revenues .....:		$11,117,000	
Net Government revenues .....:		$4,535,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		1,713	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAS Lemoore (2002)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $964,689

Change in civilian employment: 160
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 25.0%
Change in military employment: 1,993
Average income of affected military personnel: $37,230
Percent of military living on the base: 37.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAS LEMOORE (2002)

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$32,483,000	
	Induced:	$51,268,000	
	Total:	$83,750,000	(0.619%)
Employment	Direct:	252	
	Total:	2,803	(0.809%)
Income	Direct:	$4,645,000	
	Total (place of work):	$91,113,000	
	Total (place of residence):	$90,359,000	(0.742%)
Local population		5,078	(0.720%)
Local off-base population		3,242	
Number of school children		857	
Demand for housing	Rental:	822	
	Owner occupied:	474	
Government expenditures.....		$7,546,000	
Government revenues		$12,815,000	
Net Government revenues		$5,269,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		1,993	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAS Lemoore (2003)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $964,689

Change in civilian employment: 160
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 25.0%
Change in military employment: 2,273
Average income of affected military personnel: $37,230
Percent of military living on the base: 38.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAS LEMOORE (2003)

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$36,235,000	
	Induced:	$57,189,000	
	Total:	$93,424,000	(0.690%)
Employment	Direct:	281	
	Total:	3,158	(0.911%)
Income	Direct:	$5,181,000	
	Total (place of work):	$102,920,000	
	Total (place of residence):	$102,083,000	(0.838%)
Local population .....:		5,775	(0.819%)
Local off-base population .....:		3,625	
Number of school children .....:		975	
Demand for housing	Rental:	920	
	Owner occupied:	529	
Government expenditures.....:		$8,398,000	
Government revenues .....:		$14,415,000	
Net Government revenues .....:		$6,017,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		2,273	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAS Lemoore (2004)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $964,689

Change in civilian employment: 160
Average income of affected civilian personnel: $30,861
Percent expected to relocate: 25.0%
Change in military employment: 2,814
Average income of affected military personnel: $37,230
Percent of military living on the base: 38.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAS LEMOORE (2004)

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$43,764,000	
	Induced:	$69,073,000	
	Total:	$112,837,000	(0.834%)
Employment	Direct:	339	
	Total:	3,849	(1.111%)
Income	Direct:	$6,258,000	
	Total (place of work):	$125,838,000	
	Total (place of residence):	$124,819,000	(1.025%)
Local population		7,122	(1.010%)
Local off-base population		4,460	
Number of school children		1,204	
Demand for housing	Rental:	1,135	
	Owner occupied:	650	
Government expenditures.....		$10,235,000	
Government revenues		$17,672,000	
Net Government revenues		$7,437,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		2,814	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAS Lemoore (1998)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $22,625,000
Local expenditures of project: $13,849,811.29 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAS LEMOORE CUMULATIVE IMPACTS (1998)

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$11,813,000	
	Induced:	$18,645,000	
	Total:	$30,459,000	(0.220%)
Employment	Direct:	90	
	Total:	381	(0.110%)
Income	Direct:	$1,653,000	
	Total (place of work):	$9,324,000	
	Total (place of residence):	$9,274,000	(0.076%)
Local population .....:		102	(0.014%)
Local off-base population .....:		102	
Number of school children .....:		18	
Demand for housing	Rental:	45	
	Owner occupied:	0	
Government expenditures.....:		$898,000	
Government revenues .....:		$936,000	
Net Government revenues .....:		$37,000	
Civilian employees expected to relocate:		45	
Military employees expected to relocate:		0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAS Lemoore (1999)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $51,923,000
Local expenditures of project: $31,784,475.21 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAS LEMOORE CUMULATIVE IMPACTS (1999)

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$27,111,000	
	Induced:	$42,789,000	
	Total:	$69,900,000	(0.506%)
Employment	Direct:	206	
	Total:	874	(0.252%)
Income	Direct:	$3,795,000	
	Total (place of work):	$21,399,000	
	Total (place of residence):	$21,283,000	(0.175%)
Local population .....:		233	(0.033%)
Local off-base population .....:		233	
Number of school children .....:		41	
Demand for housing	Rental:	103	
	Owner occupied:	0	
Government expenditures.....:		$2,061,000	
Government revenues .....:		$2,147,000	
Net Government revenues .....:		$86,000	
Civilian employees expected to relocate:		103	
Military employees expected to relocate:		0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAS Lemoore (2000)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $42,189,000
Local expenditures of project: $25,825,842.59 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAS LEMOORE CUMULATIVE IMPACTS (2000)

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$22,029,000	
	Induced:	$34,768,000	
	Total:	$56,796,000	(0.411%)
Employment	Direct:	167	
	Total:	710	(0.205%)
Income	Direct:	$3,083,000	
	Total (place of work):	$17,387,000	
	Total (place of residence):	$17,293,000	(0.142%)
Local population .....:		189	(0.027%)
Local off-base population .....:		189	
Number of school children .....:		34	
Demand for housing	Rental:	84	
	Owner occupied:	0	
Government expenditures.....:		$1,675,000	
Government revenues .....:		$1,744,000	
Net Government revenues .....:		$70,000	
Civilian employees expected to relocate:		84	
Military employees expected to relocate:		0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAS Lemoore (2001)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $51,000,000
Local expenditures of project: $31,219,464.13 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAS LEMOORE CUMULATIVE IMPACTS (2001)

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$26,629,000	
	Induced:	$42,029,000	
	Total:	$68,658,000	(0.497%)
Employment	Direct:	202	
	Total:	858	(0.248%)
Income	Direct:	$3,727,000	
	Total (place of work):	$21,019,000	
	Total (place of residence):	$20,905,000	(0.172%)
Local population		229	(0.032%)
Local off-base population		229	
Number of school children		41	
Demand for housing	Rental:	101	
	Owner occupied:	0	
Government expenditures.....		$2,025,000	
Government revenues		$2,109,000	
Net Government revenues		$84,000	
Civilian employees expected to relocate:		101	
Military employees expected to relocate:		0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAS Lemoore (2002)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $28,150,000
Local expenditures of project: $17,231,919.90 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAS LEMOORE CUMULATIVE IMPACTS (2002)

Export income multiplier:		2.5783	
Change in local			
Sales volume	Direct:	$14,698,000	
	Induced:	$23,198,000	
	Total:	$37,896,000	(0.274%)
Employment	Direct:	112	
	Total:	474	(0.137%)
Income	Direct:	$2,057,000	
	Total (place of work):	$11,601,000	
	Total (place of residence):	$11,539,000	(0.095%)
Local population .....:		126	(0.018%)
Local off-base population .....:		126	
Number of school children .....:		22	
Demand for housing	Rental:	56	
	Owner occupied:	0	
Government expenditures.....:		$1,717,000	
Government revenues .....:		$1,164,000	
Net Government revenues .....:		$47,000	
Civilian employees expected to relocate:		56	
Military employees expected to relocate:		0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAS Lemoore (2003)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $24,802,000
Local expenditures of project: $15,182,453.91 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAS LEMOORE CUMULATIVE IMPACTS (2003)

Export income multiplier: 2.5783

Change in local			
Sales volume	Direct:	$12,950,000	
	Induced:	$20,439,000	
	Total:	$33,389,000	(0.241%)
Employment	Direct:	98	
	Total:	417	(0.120%)
Income	Direct:	$1,813,000	
	Total (place of work):	$10,222,000	
	Total (place of residence):	$10,166,000	(0.083%)
Local population		111	(0.016%)
Local off-base population		111	
Number of school children		20	
Demand for housing	Rental:	49	
	Owner occupied:	0	
Government expenditures.....		$985,000	
Government revenues		$1,026,000	
Net Government revenues		$41,000	
Civilian employees expected to relocate:		49	
Military employees expected to relocate:		0	

EIFS Model Results for NAF El Centro

RATIONAL THRESHOLD VALUES
NAF El Centro
Imperial County

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

EMPLOYMENT

YEAR	Employment	change	deviation	%deviation
1969	33,653			
1970	33,858	205	-646	-1.919 %
1971	33,916	58	-793	-2.342 %
1972	34,936	1,020	169	0.498 %
1973	36,607	1,671	820	2.347 %
1974	39,457	2,850	1,999	5.461 %
1975	42,220	2,763	1,912	4.846 %
1976	44,472	2,252	1,401	3.318 %
1977	44,214	-258	-1,109	-2.494 %
1978	44,479	265	-586	-1.325 %
1979	46,474	1,995	1,144	2.572 %
1980	45,249	-1,225	-2,076	-4.467 %
1981	43,737	-1,512	-2,363	-5.222 %
1982	43,474	-263	-1,114	-2.547 %
1983	43,121	-353	-1,204	-2.769 %
1984	42,637	-484	-1,335	-3.096 %
1985	41,388	-1,249	-2,100	-4.925 %
1986	42,777	1,389	538	1.300 %
1987	43,760	983	132	0.309 %
1988	47,737	3,977	3,126	7.144 %
1989	52,473	4,736	3,885	8.138 %
1990	52,896	423	-428	-0.816 %
1991	51,334	-1,562	-2,413	-4.562 %
1992	53,225	1,891	1,040	2.026 %

average yearly change:	851
maximum historic positive deviation:	3,885
maximum historic negative deviation:	-2,413
maximum historic % positive deviation:	8.138 %
maximum historic % negative deviation:	-5.222 %
positive rtv:	8.138 %
negative rtv:	-3.499 %

RATIONAL THRESHOLD VALUES
NAF El Centro
Imperial County

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

BUSINESS VOLUME (using Non-Farm Income)

YEAR	Non-Farm income	adjusted income	change	deviation	%deviation
1969	152,212	450,331			
1970	161,730	451,760	1,428	-17,842	-3.962 %
1971	171,617	460,099	8,339	-10,931	-2.420 %
1972	186,227	482,453	22,354	3,083	0.670 %
1973	213,909	521,729	39,276	20,005	4.147 %
1974	247,862	544,752	23,022	3,752	0.719 %
1975	280,774	564,938	20,186	915	0.168 %
1976	318,020	605,752	40,815	21,544	3.814 %
1977	345,578	618,207	12,455	-6,816	-1.125 %
1978	382,167	634,829	16,621	-2,649	-0.429 %
1979	429,228	640,639	5,810	-13,461	-2.120 %
1980	461,457	606,382	-34,256	-53,527	-8.355 %
1981	492,046	586,467	-19,915	-39,186	-6.462 %
1982	502,661	565,423	-21,044	-40,315	-6.874 %
1983	506,253	552,678	-12,745	-32,016	-5.662 %
1984	552,581	582,891	30,213	10,943	1.980 %
1985	588,297	599,691	16,800	-2,471	-0.424 %
1986	645,186	668,587	68,895	49,625	8.275 %
1987	700,289	700,289	31,702	12,432	1.859 %
1988	792,804	762,312	62,023	42,752	6.105 %
1989	866,829	795,256	32,944	13,674	1.794 %
1990	957,500	834,786	39,530	20,260	2.548 %
1991	995,033	833,361	-1,425	-20,696	-2.479 %
1992	1,097,293	893,561	60,200	40,929	4.911 %

average yearly change:	19,271
maximum historic positive deviation:	49,625
maximum historic negative deviation:	-53,527
maximum historic % positive deviation:	8.275 %
maximum historic % negative deviation:	-8.355 %
positive rtv:	8.275 %
negative rtv:	-6.266 %

RATIONAL THRESHOLD VALUES
NAF El Centro
Imperial County

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

PERSONAL INCOME

YEAR	Personal income	adjusted income	change	deviation	%deviation
1969	268,690	794,941			
1970	281,882	787,380	-7,561	-36,138	-4.546 %
1971	281,045	753,472	-33,908	-62,485	-7.936 %
1972	363,601	941,972	188,500	159,923	21.225 %
1973	401,349	978,900	36,928	8,352	0.887 %
1974	462,279	1,015,998	37,098	8,521	0.870 %
1975	490,557	987,036	-28,962	-57,538	-5.663 %
1976	549,020	1,045,752	58,716	30,139	3.054 %
1977	569,560	1,018,891	-26,862	-55,438	-5.301 %
1978	625,286	1,038,681	19,790	-8,787	-0.862 %
1979	900,513	1,344,049	305,368	276,791	26.648 %
1980	854,260	1,122,549	-221,500	-250,077	-18.606 %
1981	893,129	1,064,516	-58,033	-86,610	-7.715 %
1982	987,808	1,111,145	46,629	18,052	1.696 %
1983	1,028,069	1,122,346	11,201	-17,376	-1.564 %
1984	1,066,454	1,124,951	2,605	-25,971	-2.314 %
1985	1,062,805	1,083,389	-41,562	-70,139	-6.235 %
1986	1,092,758	1,132,392	49,002	20,426	1.885 %
1987	1,259,735	1,259,735	127,343	98,767	8.722 %
1988	1,439,442	1,384,079	124,344	95,767	7.602 %
1989	1,599,199	1,467,155	83,076	54,499	3.938 %
1990	1,693,858	1,476,772	9,617	-18,959	-1.292 %
1991	1,684,094	1,410,464	-66,309	-94,885	-6.425 %
1992	1,783,310	1,452,207	41,743	13,166	0.933 %

average yearly change:	28,577
maximum historic positive deviation:	276,791
maximum historic negative deviation:	-250,077
maximum historic % positive deviation:	26.648 %
maximum historic % negative deviation:	-18.606 %
positive rtv:	26.648 %
negative rtv:	-12.466 %

STANDARD EIFS FORECAST MODEL

Project name: E-2 Realignment to NAF El Centro (1998)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Change in expenditures for services and supplies: $700,150 (Annual procurement of $1,400,300 for a half year)
Change in expenditures for local services and supplies: $283,343.25 (calculated)

Change in civilian employment: 26 (Half the 105 civilian personnel for half a year, assuming immediate ramp-up in July of 1998)
Average income of affected civilian personnel: $25,734
Percent expected to relocate: (0.0) 38.1 percent (20 are assumed to relocate; the other 32 would be hired at the local economy level)
Change in military employment: 237 (Half the 948 military personnel for half a year, assuming immediate ramp-up in July 1998)
Average income of affected military personnel: $27,331
Percent of military living on the base: 33.0 percent (The unaccompanied personnel who are assumed to live in BOQ/BEQ)

STANDARD EIFS MODEL FORECAST FOR E-2 Realignment to NAF El Centro (1998)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$3,261,000	
	Induced:	$2,217,000	
	Total:	$5,477,000	(0.358%)
Employment	Direct:	24	
	Total:	304	(0.694%)
Income	Direct:	$405,000	
	Total (place of work):	$7,827,000	
	Total (place of residence):	$7,827,000	(0.492%)
Local population		620	(0.599%)
Local off-base population		425	
Number of school children		106	
Demand for housing	Rental:	106	
	Owner occupied:	63	
Government expenditures.....		$1,065,000	
Government revenues		$2,286,000	
Net Government revenues		$1,221,000	
Civilian employees expected to relocate:		10	
Military employees expected to relocate:		237	

STANDARD EIFS FORECAST MODEL

Project name: E-2 Realignment to NAF El Centro (1999)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Change in expenditures for services and supplies: $1,400,300
Change in expenditures for local services and supplies: $566,686.50 (calculated)

Change in civilian employment: 105 (Assuming immediate ramp-up of remaining E-2 personnel in January 1999)
Average income of affected civilian personnel: $25,734
Percent expected to relocate: (0.0) 38.1 percent (20 are assumed to relocate; the other 32 would be hired at the local economy level)
Change in military employment: 948 (Assuming immediate ramp-up of remaining E-2 personnel in January 1999)
Average income of affected military personnel: $27,331
Percent of military living on the base: 33.0 percent

STANDARD EIFS MODEL FORECAST FOR E-2 Realignment to NAF El Centro (1999)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$12,495,000	
	Induced:	$8,494,000	
	Total:	$20,989,000	(1.371%)
Employment	Direct:	93	
	Total:	1,210	(2.764%)
Income	Direct:	$1,552,000	
	Total (place of work):	$31,218,000	
	Total (place of residence):	$31,218,000	(1.962%)
Local population		2,480	(2.399%)
Local off-base population		1,701	
Number of school children		425	
Demand for housing	Rental:	423	
	Owner occupied:	252	
Government expenditures.....		$4,248,000	
Government revenues		$9,127,000	
Net Government revenues		$4,879,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		948	

STANDARD EIFS FORECAST MODEL

Project name: E-2 Realignment to NAF El Centro (2000)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Change in expenditures for services and supplies: $1,400,300
Change in expenditures for local services and supplies: $566,686.50 (calculated)

Change in civilian employment: 105
Average income of affected civilian personnel: $25,734
Percent expected to relocate: (0.0) 38.1 percent

Change in military employment: 948
Average income of affected military personnel: $27,331
Percent of military living on the base: 33.0 percent

STANDARD EIFS MODEL FORECAST FOR E-2 Realignment to NAF El Centro (2000)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$12,495,000	
	Induced:	$8,494,000	
	Total:	$20,989,000	(1.371%)
Employment	Direct:	93	
	Total:	1,210	(2.764%)
Income	Direct:	$1,552,000	
	Total (place of work):	$31,218,000	
	Total (place of residence):	$31,218,000	(1.962%)
Local population		2,480	(2.399%)
Local off-base population		1,701	
Number of school children		425	
Demand for housing	Rental:	423	
	Owner occupied:	252	
Government expenditures.....		$4,248,000	
Government revenues		$9,127,000	
Net Government revenues		$4,879,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		948	

STANDARD EIFS FORECAST MODEL

Project name: E-2 Realignment to NAF El Centro (2001)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Change in expenditures for services and supplies: $1,400,300
Change in expenditures for local services and supplies: $566,686.50 (calculated)

Change in civilian employment: 105
Average income of affected civilian personnel: $25,734
Percent expected to relocate: (0.0) 38.1 percent

Change in military employment: 948
Average income of affected military personnel: $27,331
Percent of military living on the base: 33.0 percent

STANDARD EIFS MODEL FORECAST FOR E-2 Realignment to NAF El Centro (2001)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$12,495,000	
	Induced:	$8,494,000	
	Total:	$20,989,000	(1.371%)
Employment	Direct:	93	
	Total:	1,210	(2.764%)
Income	Direct:	$1,552,000	
	Total (place of work):	$31,218,000	
	Total (place of residence):	$31,218,000	(1.962%)
Local population		2,480	(2.399%)
Local off-base population		1,701	
Number of school children		425	
Demand for housing	Rental:	423	
	Owner occupied:	252	
Government expenditures.....		$4,248,000	
Government revenues		$9,127,000	
Net Government revenues		$4,879,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		948	

CONSTRUCTION

Project name: E-2 Realignment to NAF El Centro (1998)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $27,329,000
Local expenditures of project: $11,059,755.43 (calculated)
Percent for labor: (34.2)
Percent for materials: (57.8)
Percent allowed for other: 8.00 (calculated)
Percent of construction workers expected to migrate into the area: (30.0)

CONSTRUCTION IMPACT FORECAST FOR E-2 Realignment to NAF El Centro (1998)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$9,434,000	
	Induced:	$6,413,000	
	Total:	$15,847,000	(1.014%)
Employment	Direct:	69	
	Total:	238	(0.544%)
Income	Direct:	$1,147,000	
	Total (place of work):	$5,968,000	
	Total (place of residence):	$5,968,000	(0.375%)
Local population		83	(0.081%)
Local off-base population		83	
Number of school children		15	
Demand for housing	Rental:	37	
	Owner occupied:	0	
Government expenditures.....		$696,000	
Government revenues		$1,315,000	
Net Government revenues		$619,000	
Civilian employees expected to relocate:		37	
Military employees expected to relocate:		0	

CONSTRUCTION

Project name: E-2 Realignment to NAF El Centro (1999)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $37,450,000
Local expenditures of project: $15,155,616.41 (calculated)
Percent for labor: (34.2)
Percent for materials: (57.8)
Percent allowed for other: 8.00 (calculated)
Percent of construction workers expected to migrate into the area: (30.0)

CONSTRUCTION IMPACT FORECAST FOR E-2 Realignment to NAF El Centro (1999)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$12,927,000	
	Induced:	$8,788,000	
	Total:	$21,715,000	(1.389%)
Employment	Direct:	94	
	Total:	326	(0.746%)
Income	Direct:	$1,571,000	
	Total (place of work):	$8,178,000	
	Total (place of residence):	$8,178,000	(0.514%)
Local population .....:		114	(0.110%)
Local off-base population .....:		114	
Number of school children .....:		20	
Demand for housing	Rental:	50	
	Owner occupied:	0	
Government expenditures.....:		$953,000	
Government revenues .....:		$1,802,000	
Net Government revenues .....:		$848,000	
Civilian employees expected to relocate:		50	
Military employees expected to relocate:		0	

CONSTRUCTION

Project name: E-2 Realignment to NAF El Centro (2000)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $5,061,000
Local expenditures of project: $2,048,132.83 (calculated)
Percent for labor: (34.2)
Percent for materials: (57.8)
Percent allowed for other: 8.00 (calculated)
Percent of construction workers expected to migrate into the area: (30.0)

CONSTRUCTION IMPACT FORECAST FOR E-2 Realignment to NAF El Centro (2000)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$1,747,000	
	Induced:	$1,188,000	
	Total:	$2,935,000	(0.188%)
Employment	Direct:	13	
	Total:	44	(0.101%)
Income	Direct:	$212,000	
	Total (place of work):	$1,105,000	
	Total (place of residence):	$1,105,000	(0.069%)
Local population		15	(0.015%)
Local off-base population		15	
Number of school children		2	
Demand for housing	Rental:	7	
	Owner occupied:	0	
Government expenditures.....		$129,000	
Government revenues		$244,000	
Net Government revenues		$115,000	
Civilian employees expected to relocate:		7	
Military employees expected to relocate:		0	

RATIONAL THRESHOLD VALUES
NAF El Centro
Imperial County

All dollar amounts are in thousands of dollars.
Dollar adjustment based on Consumer Price Index (1987=100).

POPULATION

YEAR	Population	change	deviation	%deviation
1969	73,600			
1970	74,800	1,200	-1,209	-1.642 %
1971	74,900	100	-2,309	-3.086 %
1972	75,900	1,000	-1,409	-1.881 %
1973	79,600	3,700	1,291	1.701 %
1974	81,500	1,900	-509	-0.639 %
1975	83,000	1,500	-909	-1.115 %
1976	85,300	2,300	-109	-0.131 %
1977	87,000	1,700	-709	-0.831 %
1978	88,500	1,500	-909	-1.044 %
1979	90,100	1,600	-809	-0.914 %
1980	92,900	2,800	391	0.434 %
1981	94,800	1,900	-509	-0.548 %
1982	96,600	1,800	-609	-0.642 %
1983	98,300	1,700	-709	-0.734 %
1984	99,300	1,000	-1,409	-1.433 %
1985	101,500	2,200	-209	-0.210 %
1986	101,700	200	-2,209	-2.176 %
1987	103,400	1,700	-709	-0.697 %
1988	105,700	2,300	-109	-0.105 %
1989	107,800	2,100	-309	-0.292 %
1990	111,100	3,300	891	0.827 %
1991	118,500	7,400	4,991	4.493 %
1992	129,000	10,500	8,091	6.828 %

average yearly change:	2,409
maximum historic positive deviation:	8,091
maximum historic negative deviation:	-2,309
maximum historic % positive deviation:	6.828 %
maximum historic % negative deviation:	-3.086 %
positive rtv:	6.828 %
negative rtv:	-1.543 %

Source: Bureau of Economic Analysis

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAF El Centro (1998)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $283,343

Change in civilian employment: 26
Average income of affected civilian personnel: $25,734
Percent expected to relocate: 38.1%
Change in military employment: 237
Average income of affected military personnel: $27,331
Percent of military living on the base: 33.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (1998)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$3,261,000	
	Induced:	$2,217,000	
	Total:	$5,477,000	(0.358%)
Employment	Direct:	24	
	Total:	304	(0.694%)
Income	Direct:	$405,000	
	Total (place of work):	$7,827,000	
	Total (place of residence):	$7,827,000	(0.492%)
Local population		620	(0.599%)
Local off-base population		425	
Number of school children		106	
Demand for housing	Rental:	106	
	Owner occupied:	63	
Government expenditures.....		$1,065,000	
Government revenues		$2,286,000	
Net Government revenues		$1,221,000	
Civilian employees expected to relocate:		10	
Military employees expected to relocate:		237	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAF El Centro (1999)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $566,687
Change in civilian employment: 305
Average income of affected civilian personnel: $8,859
Percent expected to relocate: 13.12%
Change in military employment: 994
Average income of affected military personnel: $26,066
Percent of military living on the base: 31.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (1999)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$12,596,000	
	Induced:	$8,563,000	
	Total:	$21,159,000	(1.383%)
Employment	Direct:	94	
	Total:	1,457	(3.329%)
Income	Direct:	$1,564,000	
	Total (place of work):	$31,239,000	
	Total (place of residence):	$31,239,000	(1.963%)
Local population		2,595	(2.509%)
Local off-base population		1,827	
Number of school children		445	
Demand for housing	Rental:	456	
	Owner occupied:	270	
Government expenditures.....		$4,957,000	
Government revenues		$9,355,000	
Net Government revenues		$4,398,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		994	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAF El Centro (2000)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $674,187

Change in civilian employment: 305
Average income of affected civilian personnel: $29,096
Percent expected to relocate: 13.12%
Change in military employment: 1,742
Average income of affected military personnel: $31,843
Percent of military living on the base: 37.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (2000)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$28,054,000	
	Induced:	$19,071,000	
	Total:	$47,125,000	(3.079%)
Employment	Direct:	209	
	Total:	2,399	(5.481%)
Income	Direct:	$3,484,000	
	Total (place of work):	$70,197,000	
	Total (place of residence):	$70,197,000	(4.412%)
Local population		4,457	(4.311%)
Local off-base population		2,852	
Number of school children		767	
Demand for housing	Rental:	719	
	Owner occupied:	418	
Government expenditures.....		$7,595,000	
Government revenues		$18,794,000	
Net Government revenues		$11,199,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		1,742	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAF El Centro (2001)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $674,187

Change in civilian employment: 305
Average income of affected civilian personnel: $29,096
Percent expected to relocate: 13.12%
Change in military employment: 2,191
Average income of affected military personnel: $32,947
Percent of military living on the base: 38.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (2001)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$34,195,000	
	Induced:	$23,245,000	
	Total:	$57,440,000	(3.753%)
Employment	Direct:	255	
	Total:	2,925	(6.683%)
Income	Direct:	$4,247,000	
	Total (place of work):	$88,195,000	
	Total (place of residence):	$88,195,000	(5.543%)
Local population		5,575	(5.392%)
Local off-base population		3,502	
Number of school children		961	
Demand for housing	Rental:	886	
	Owner occupied:	512	
Government expenditures.....		$9,168,000	
Government revenues		$23,468,000	
Net Government revenues		$14,300,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		2,191	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAF El Centro (2002)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $674,187

Change in civilian employment: 305
Average income of affected civilian personnel: $29,096
Percent expected to relocate: 13.12%
Change in military employment: 2,675
Average income of affected military personnel: $33,722
Percent of military living on the base: 38.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (2002)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$40,931,000	
	Induced:	$27,824,000	
	Total:	$68,755,000	(4.493%)
Employment	Direct:	305	
	Total:	3,493	(7.982%)
Income	Direct:	$5,083,000	
	Total (place of work):	$107,619,000	
	Total (place of residence):	$107,619,000	(6.764%)
Local population		6,780	(6.557%)
Local off-base population		4,249	
Number of school children		1,169	
Demand for housing	Rental:	1,078	
	Owner occupied:	620	
Government expenditures.....		$10,968,000	
Government revenues		$28,593,000	
Net Government revenues		$17,626,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		2,675	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAF El Centro (2003)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $674,187

Change in civilian employment: 305
Average income of affected civilian personnel: $29,096
Percent expected to relocate: 13.12%
Change in military employment: 2,951
Average income of affected military personnel: $34,050
Percent of military living on the base: 38.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (2003)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$44,772,000	
	Induced:	$30,436,000	
	Total:	$75,207,000	(4.914%)
Employment	Direct:	334	
	Total:	3,817	(8.723%)
Income	Direct:	$5,560,000	
	Total (place of work):	$118,696,000	
	Total (place of residence):	$118,696,000	(7.460%)
Local population .....:		7,468	(7.222%)
Local off-base population .....:		4,675	
Number of school children .....:		1,288	
Demand for housing	Rental:	1,188	
	Owner occupied:	682	
Government expenditures.....:		$11,994,000	
Government revenues .....:		$31,516,000	
Net Government revenues .....:		$19,522,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		2,951	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAF El Centro (2004)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $674,187

Change in civilian employment: 305
Average income of affected civilian personnel: $29,096
Percent expected to relocate: 13.12%
Change in military employment: 3,952
Average income of affected military personnel: $34,855
Percent of military living on the base: 39.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (2004)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$58,433,000	
	Induced:	$39,723,000	
	Total:	$98,156,000	(6.414%)
Employment	Direct:	436	
	Total:	4,989	(11.402%)
Income	Direct:	$7,257,000	
	Total (place of work):	$158,811,000	
	Total (place of residence):	$158,811,000	(9.982%)
Local population .....:		9,960	(9.633%)
Local off-base population .....:		6,122	
Number of school children .....:		1,720	
Demand for housing	Rental:	1,560	
	Owner occupied:	891	
Government expenditures.....:		$15,497,000	
Government revenues .....:		$41,931,000	
Net Government revenues .....:		$26,435,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		3,952	

STANDARD EIFS FORECAST MODEL CUMULATIVE IMPACTS

Project name: NAF El Centro (2005)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (business volume)	(PPI - 1987)	= 100.0
local services and supplies	(PPI - 1993)	= 115.7
output and incomes (business volume)	(PPI - 1993)	= 115.7

(Enter decreases as negative numbers)
If entering total expenditures, enter 1
local expenditures, enter 2 : 2
Change in expenditures for local services and supplies: $674,187

Change in civilian employment: 305
Average income of affected civilian personnel: $29,096
Percent expected to relocate: 13.12%
Change in military employment: 4,401
Average income of affected military personnel: $35,098
Percent of military living on the base: 39.0%

STANDARD EIFS MODEL FORECAST FOR CUMULATIVE IMPACTS, NAF EL CENTRO (2005)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$64,650,000	
	Induced:	$43,949,000	
	Total:	$108,599,000	(7.096%)
Employment	Direct:	482	
	Total:	5,516	(12.606%)
Income	Direct:	$8,029,000	
	Total (place of work):	$176,827,000	
	Total (place of residence):	$176,827,000	(11.114%)
Local population .....:		11,078	(10,714%)
Local off-base population .....:		6,804	
Number of school children .....:		1,914	
Demand for housing	Rental:	1,735	
	Owner occupied:	989	
Government expenditures.....:		$17,142,000	
Government revenues .....:		$46,666,000	
Net Government revenues .....:		$29,524,000	
Civilian employees expected to relocate:		40	
Military employees expected to relocate:		4,401	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAF El Centro (1998)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $27,329,000
Local expenditures of project: $11,059,755.43 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAF EL CENTRO CUMULATIVE IMPACTS (1998)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$9,434,000	
	Induced:	$6,413,000	
	Total:	$15,847,000	(1.014%)
Employment	Direct:	69	
	Total:	238	(0.544%)
Income	Direct:	$1,147,000	
	Total (place of work):	$5,968,000	
	Total (place of residence):	$5,968,000	(0.375%)
Local population		83	(0.081%)
Local off-base population		83	
Number of school children		15	
Demand for housing	Rental:	37	
	Owner occupied:	0	
Government expenditures.....		$696,000	
Government revenues		$1,315,000	
Net Government revenues		$619,000	
Civilian employees expected to relocate:		37	
Military employees expected to relocate:		0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAF El Centro (1999)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $57,990,000
Local expenditures of project: $23,467,935.79 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAF EL CENTRO CUMULATIVE IMPACTS (1999)

Export income multiplier: 1.6798

Change in local			
Sales volume	Direct:	$20,017,000	
	Induced:	$13,608,000	
	Total:	$33,625,000	(2.151%)
Employment	Direct:	146	
	Total:	505	(1.155%)
Income	Direct:	$2,433,000	
	Total (place of work):	$12,664,000	
	Total (place of residence):	$12,664,000	(0.796%)
Local population .....:		177	(0.171%)
Local off-base population .....:		177	
Number of school children .....:		32	
Demand for housing	Rental:	78	
	Owner occupied:	0	
Government expenditures.....:		$1,476,000	
Government revenues .....:		$2,790,000	
Net Government revenues .....:		$1,314,000	
Civilian employees expected to relocate:		78	
Military employees expected to relocate:		0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAF El Centro (2000)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $42,871,000
Local expenditures of project: $17,349,437.41 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAF EL CENTRO CUMULATIVE IMPACTS (2000)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$14,799,000	
	Induced:	$10,060,000	
	Total:	$24,858,000	(1.590%)
Employment	Direct:	108	
	Total:	374	(0.854%)
Income	Direct:	$1,799,000	
	Total (place of work):	$9,362,000	
	Total (place of residence):	$9,362,000	(0.588%)
Local population		131	(0.126%)
Local off-base population		131	
Number of school children		24	
Demand for housing	Rental:	58	
	Owner occupied:	0	
Government expenditures.....		$1,091,000	
Government revenues		$2,063,000	
Net Government revenues		$971,000	
Civilian employees expected to relocate:		58	
Military employees expected to relocate:		0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAF El Centro (2001)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $51,000,000
Local expenditures of project: $20,639,157.19 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAF EL CENTRO CUMULATIVE IMPACTS (2001)

Export income multiplier: 1.6798

Change in local			
Sales volume	Direct:	$17,605,000	
	Induced:	$11,967,000	
	Total:	$29,572,000	(1.891%)
Employment	Direct:	129	
	Total:	445	(1.016%)
Income	Direct:	$2,140,000	
	Total (place of work):	$11,137,000	
	Total (place of residence):	$11,137,000	(0.700%)
Local population .....:		155	(0.150%)
Local off-base population .....:		155	
Number of school children .....:		28	
Demand for housing	Rental:	69	
	Owner occupied:	0	
Government expenditures.....:		$1,298,000	
Government revenues .....:		$2,454,000	
Net Government revenues .....:		$1,155,000	
Civilian employees expected to relocate:		69	
Military employees expected to relocate:		0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAF El Centro (2002)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $28,150,000
Local expenditures of project: $11,392,005.39 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAF EL CENTRO CUMULATIVE IMPACTS (2002)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$9,717,000	
	Induced:	$6,606,000	
	Total:	$16,323,000	(1.044%)
Employment	Direct:	71	
	Total:	245	(0.561%)
Income	Direct:	$1,181,000	
	Total (place of work):	$6,147,000	
	Total (place of residence):	$6,147,000	(0.386%)
Local population		86	(0.083%)
Local off-base population		86	
Number of school children		15	
Demand for housing	Rental:	38	
	Owner occupied:	0	
Government expenditures.....		$717,000	
Government revenues		$1,354,000	
Net Government revenues		$638,000	
Civilian employees expected to relocate:		38	
Military employees expected to relocate:		0	

CONSTRUCTION CUMULATIVE IMPACTS

Project name: NAF El Centro (2003)

Default price deflators:

baseline year (ex. business volume)	(CPI - 1987)	= 100.0
output and incomes (ex b.v.)	(CPI - 1993)	= 126.3
baseline year (construction)	(ENR-const - 1987)	= 100.0
local expenditures for construction	(ENR-const - 1993)	= 118.2
output and incomes (construction)	(ENR-const - 1993)	= 118.2

If entering total expenditures, enter 1
local expenditures, enter 2 : 1
Dollar volume of construction project: $24,802,000
Local expenditures of project: $10,037,105.42 (calculated)
Percent for labor: 34.2%
Percent for materials: 57.8%
Percent allowed for other: 8.0%
Percent of construction workers expected to migrate into the area: 30.0%

CONSTRUCTION IMPACT FORECAST FOR NAF EL CENTRO CUMULATIVE IMPACTS (2003)

Export income multiplier:		1.6798	
Change in local			
Sales volume	Direct:	$8,561,000	
	Induced:	$5,820,000	
	Total:	$14,381,000	(0.920%)
Employment	Direct:	63	
	Total:	216	(0.494%)
Income	Direct:	$1,041,000	
	Total (place of work):	$5,416,000	
	Total (place of residence):	$5,416,000	(0.340%)
Local population .....:		76	(0.073%)
Local off-base population .....:		76	
Number of school children .....:		13	
Demand for housing	Rental:	33	
	Owner occupied:	0	
Government expenditures.....:		$631,000	
Government revenues .....:		$1,193,000	
Net Government revenues .....:		$562,000	
Civilian employees expected to relocate:		33	
Military employees expected to relocate:		0	

This page intentionally left blank.

Appendix D. Conformity Determination/Air Quality

APPENDIX D
CONFORMITY DETERMINATION/AIR QUALITY

D.1 INTRODUCTION

This appendix contains documentation for the emissions analyses and carbon monoxide dispersion modeling analyses presented in Chapter 4 of the DEIS. In addition, this appendix contains a discussion of Clean Air Act conformity requirements plus a conformity determination for the NAWS Point Mugu Alternative.

Emissions analyses used for NEPA impact assessment purposes are more comprehensive than those used for conformity determination purposes. The description of analysis procedures used for different categories of emission sources identifies the types of emission sources excluded from the conformity analysis.

D.2 PROCEDURES USED FOR EMISSION ESTIMATES

D.2.1 Construction Activity

Emission estimates for facility construction activities account for fugitive dust from construction sites plus exhaust emissions from heavy construction equipment. Site disturbance and heavy equipment use will be important only for new construction or facility expansion. Interior building renovations and the interior finishing stage of building construction are assumed to have minimal air quality impacts.

All aircraft-related and training-related facilities were assumed to have a 1998 construction start. Housing facilities and personnel support facilities were assumed to have a 1999 construction start. As a conservative analysis, all construction emissions were assumed to occur in the construction start year. Any construction activities carried over into the following year are assumed to be interior finishing work with minimal emissions.

Construction site acreages were estimated from building size estimates, with most structures assumed to be single story construction. Disturbed areas for construction sites were assumed to occupy as much as twice the facility footprint. Table D-1 presents construction site acreage estimates for the three alternatives. The NAWS Point Mugu Alternative would require the least amount of construction, and all of it is assumed to start in 1998.

Emission estimates for facility construction were developed by splitting the overall construction activity into two phases: site and foundation preparation, and facility construction. The entire construction site was assumed to be disturbed during site and foundation preparation. Only areas outside the facility footprint would be subject to disturbance during the actual building construction phase. Tables D-2 through D-11 present 1998 and 1999 construction emission estimates for each alternative.

Construction emission estimates are based on data and procedures outlined in US Environmental Protection Agency (1985a; 1995). The PM10 portion of fugitive dust is estimated as equivalent to the silt plus clay fraction of typical soils, with additional emission rate adjustments for the effectiveness of standard dust control practices. The resulting emission rate is about 15.4 pounds per acre-day of construction activity. Construction equipment exhaust emission rates are taken from US Environmental Protection Agency (1985b), and are summarized in Table D-12.

D.2.2 E-2 Aircraft Operations

Aircraft emission estimates have been prepared in a manner consistent with data and procedures outlined in US Environmental Protection Agency (1992). To be consistent with normal emission inventory procedures, only emissions released within 3,000 feet of ground level are included in the analysis.

Table D-13 summarizes data used for the analysis of E-2 flight activity emissions. The number of annual departures and arrivals reflect current estimates of the maximum number of aircraft sorties. The annual number of touch-and-go, FCLP, and GCA box pattern events is based on a previous analyses of E-2 squadron realignment (US Navy 1994). Time-in-mode estimates for pattern events were estimated from analysis of flight track profiles from a recent noise study for NAS Lemoore (Wyle Research 1994). Table D-14 presents the estimated annual emissions from E-2 aircraft flight operations.

In addition to direct flight operations, there will be emissions associated with engine tests performed after engine maintenance. Emission estimates for these engine run-ups are presented in Table D-15. In-frame engine run-ups are performed when maintenance activities are performed without removing the engine from the aircraft.

When engines are removed for more extensive maintenance, high power run-up tests are performed in engine test cells. Engine test cells generally require permits from local air pollution control districts, and thus are considered a stationary source excluded from general conformity analyses.

D.2.3 Aircraft Support Equipment

Aircraft operations generally require the use of some specialized ground support equipment. The most common equipment includes tow tractors and cargo lifters. Because airfields for all alternatives either have or will install fixed point utility systems, mobile generators and air conditioning systems will seldom be used.

Table D-16 presents estimated emissions from ground support equipment that will be used by the E-2 aircraft. Because no specific equipment use requirements are available, the analysis presented in Table D-16 is based on generalized equipment types and operating time estimates.

D.2.4 Aircraft Refueling

E-2 aircraft use JP-5 (jet kerosene) aircraft fuel. The E-2 squadrons are expected to use about 4.1 million gallons of fuel per year. Fuel handling and transfers will result in small quantities of evaporative emissions as liquid fuel displaces air and fuel vapors when fuel tanks are filled (US Environmental Protection Agency 1995). As indicated in Table D-17, fuel transfer emissions vary with temperature. The emission rates indicated in Table D-17 assume splash loading of fuel tanks. The maximum emissions would occur if aircraft are refueled from fuel trucks rather than from fixed refueling systems. When fuel trucks are used, two fuel transfers are required: filling the tank truck, and fueling the aircraft.

The three alternative receiving installations for the E-2 aircraft experience different seasonal temperature patterns (WeatherDisc Associates 1990). Refueling emission estimates for the NAWS Point Mugu Alternative (Table D-18) assume three months with an average temperature of about 50 degrees Fahrenheit and nine months with an average temperature of about 60 degrees Fahrenheit. Refueling emission estimates for the NAS Lemoore Alternative (Table D-19) assume one month with an average temperature of 40 degrees Fahrenheit, four months with an average temperature of 50 degrees Fahrenheit, one month with an average temperature of 60 degrees Fahrenheit, four months with an average temperature of 70 degrees Fahrenheit, and two months with an average temperature of 80 degrees Fahrenheit. Refueling emission estimates for the NAF El Centro Alternative (Table D-20) assume five months with an average temperature of 60 degrees Fahrenheit, one month with an average temperature of 70 degrees Fahrenheit, two months with an average temperature of 80 degrees Fahrenheit, and four months with an average temperature of 90 degrees Fahrenheit.

D.2.5 Paint, Solvent, and Abrasive Use for Aircraft Maintenance

Paints, solvents, and abrasive blasting media used for aircraft and engine maintenance activities will be additional minor sources of emissions associated

with E-2 aircraft. Information specific to E-2 aircraft maintenance was not readily available. Information was available from NAS Lemoore that provided generalized paint, solvent, and abrasive blast media use rates on a per-aircraft basis (Castro 1997b). Emission rate estimates (Table D-17) are based on typical solvent content for paints, 100 percent volatility for solvents, and 1 percent emissions for abrasive blast media.

Paint, solvent, and abrasive blast media emission estimates are presented in Tables D-18 for the NAWS Point Mugu Alternative, Table D-19 for the NAS Lemoore Alternative, and Table D-20 for the NAF El Centro Alternative. Aircraft and engine maintenance activities will generally occur in facilities subject to air pollution control district permit requirements. Thus, these emissions would generally be considered stationary source emissions excluded from conformity analyses.

D.2.6 Miscellaneous Portable And Stationary Engines

Aircraft and engine maintenance activities and airfield operations are likely to make occasional use of portable and stationary engines for a variety of purposes (e.g., generators, compressors, pumps, fans, hydraulic test stands, etc.). For analysis purposes, portable and stationary engines have been divided into hydraulic test stands that use JP-5 for fuel and diesel-fueled engines. Data from NAS Lemoore (Castro 1997a; 1997b) indicate relatively low use rates for this equipment. Emission estimates for each alternative are based on generic use assumptions (i.e., 8,000 horsepower-hours of diesel engine use per year and 88 hours per year of hydraulic test stand engine use). Emission estimates for miscellaneous small engine use are presented in Tables D-18 for the NAWS Point Mugu Alternative, Table D-19 for the NAS Lemoore Alternative, and Table D-20 for the NAF El Centro Alternative.

D.2.7 Natural Gas Use For Space And Water Heating

Space heating and water heating requirements for buildings generally will be met using natural gas as a heating fuel. Data from NAS Lemoore (Castro 1997a) indicate consistent sizes for boiler facilities used in hangars and BEQ/BOQ housing (Table D-17). Boilers in these size ranges require permits from air pollution control districts, and thus are stationary sources excluded from conformity analyses. Natural gas use for family housing, personnel support facilities, and general administrative space has been estimated using generic energy use assumptions derived from data in Hunn (1996).

Emission estimates for natural gas use are presented in Tables D-18 for the NAWS Point Mugu Alternative, Table D-19 for the NAS Lemoore Alternative, and Table D-20 for the NAF El Centro Alternative.

D.2.8 Personal Vehicle Use

Air pollutant emissions associated with personal vehicle travel were estimated by combining appropriate vehicle emission rates and travel pattern estimates. Travel

pattern estimates were developed to reflect typical travel patterns for trips from on-base housing versus trips from off-base housing. Vehicle emission rates were calculated using the EMFAC7F vehicle emission rate model (California Air Resources Board 1992; 1993).

The EMFAC model. EMFAC7F determines vehicle emission rates based on a wide range of factors: pollutants of interest; calendar year; air temperature; mix of vehicle types; vehicle operating mode conditions; average route speed; age distribution of vehicles by type; average annual mileage accumulations by vehicle age and type; basic exhaust emission rates for new vehicles by vehicle type and model year; deterioration rates for exhaust emissions by vehicle type and accumulated mileage; and the effectiveness of vehicle inspection and maintenance programs.

EMFAC7F is designed primarily for use in generating regional and statewide emission inventories rather than for performing project-specific analyses. The model is structured to use state-wide average default values for most input parameters. To provide flexibility for project-specific analyses, standardized EMFAC7F output files provided by the California Air Resources Board (CARB) were placed into a spreadsheet model that performs appropriate unit conversions and composite weightings while allowing the user to vary key parameters of interest. Lookup table data in the spreadsheet version of EMFAC7F are based on 5 mph speed increments and 10 degree temperature increments.

The EMFAC7F program recognizes three operating mode conditions for gasoline-fueled passenger vehicles. These operating modes (i.e., cold start, hot start, and hot stabilized) are a function of four factors: how long a vehicle's engine has been on; how long the vehicle was parked before the engine was started; the operating mode condition of the vehicle at the time it was previously parked; and whether the vehicle has a catalytic converter. Vehicles operating in a cold start mode have significantly higher emission rates than those operating in hot start or hot stabilized modes.

Vehicle operating modes. Vehicle operating mode definitions reflect the conditions of standardized test procedures used to certify that new vehicles meet applicable federal and state emission standards. By definition, the hot stabilized mode represents all vehicle operations occurring after the engine has been on for 505 seconds. The first 505 seconds of vehicle operation will be in either a cold start or a hot start mode. Cold start and hot start operating modes are distinguished by three factors: the operating mode condition of the vehicle when parked; the duration of parking preceding vehicle start-up; and the presence or absence of a catalytic converter.

Vehicles with a catalytic converter will resume operations in a cold start mode after the engine has been off for 1 hour or more. Vehicles without a catalytic converter resume operations in a cold start mode after the engine has been off for

4 hours or more. Any vehicle that is still in a cold start mode when parked will resume operations in a cold start mode regardless of the parking duration.

If a catalyst-equipped vehicle is parked for less than 1 hour, it will resume operations in a hot start mode (unless the vehicle was still in a cold start mode when it parked). If a noncatalyst vehicle is parked for a period of less than 4 hours, it will resume operations in a hot start mode.

Parking duration patterns vary by trip purpose. Work trips often begin in a cold start mode and end with a long parking duration. Shopping trips are more likely to begin in a hot start mode and end with a short or intermediate parking duration. Typical cold start and hot start patterns by trip type have been developed by the California Department of Transportation (CalTrans) using data from statewide travel pattern surveys (California Department of Transportation 1981).

Average vehicle operating mode conditions can be calculated directly from a known or assumed travel time distribution. Travel time distribution assumptions are most easily established by separating overall vehicle travel into trip purpose categories that can be associated with residential and nonresidential land use categories. Three trip categories (home-work trips, home-shopping trips, home-other trips) are normally used for residential land uses. Two additional trip categories (other-work and other-other) are typically added for nonresidential land uses.

Travel patterns. The analyses used for this DEIS were developed separately for on-base and off-base housing. Travel patterns associated with off-base housing were evaluated in greater detail than those associated with on-base housing.

A single generic travel time distribution pattern was use for on-base housing at each alternative (Table D-21). Vehicle emission rates for trips from on-base housing were prepared separately for each alternative, since summer temperature patterns differ significantly among the alternative receiving installation. Differences in diurnal temperature patterns affect both exhaust and evaporative emissions from motor vehicles. EMFAC7F input assumptions and resulting emission rates for trips from on-base housing are presented in Tables D-22 and D-23 for the NAWS Point Mugu Alternative, in Tables D-24 and D-25 for the NAS Lemoore Alternative, and in Tables D-26 and D-27 for the NAF El Centro Alternative.

Separate travel time distribution patterns were developed for trips associated with off-base housing for each alternative (Tables D-28, D-29, and D-30). The travel time patterns were developed by considering areawide land use patterns and highway systems. The mean work trip travel times produced by this analysis are somewhat shorter than the average commute times presented in published summaries of travel survey data (US Federal Highway Administration 1985;

California Department of Transportation 1992). EMFAC7F input assumptions and resulting emission rates for trips from off-base housing are presented in Tables D-31 and D-32 for the NAWS Point Mugu Alternative, in Tables D-33 and D-34 for the NAS Lemoore Alternative, and in Tables D-35 and D-36 for the NAF El Centro Alternative.

Emission estimates. Travel time distributions and associated vehicle emission factors were converted into overall emission estimates by establishing vehicle trip generation rates and vehicle speed distribution patterns by trip purpose and on-base versus off-base housing situation. Different speed distributions were used at each alternative receiving installation for work trips from on-base housing, thus converting the generic travel time pattern into different average trip distance values.

Tables D-37 and D-38 summarize the vehicle emissions analysis for the NAWS Point Mugu Alternative. Tables D-39 and D-40 summarize the analysis for the NAS Lemoore Alternative. Tables D-41 and D-42 summarize the analysis for the NAF El Centro Alternative. Vehicle emissions have been separated into two components: emissions associated with base-related travel (work-related travel), and emissions associated with other household travel (shopping and other travel). Base-related emissions are included in conformity analyses.

The EMFAC7F model does not estimate sulfur oxide emissions from motor vehicles. Sulfur oxide emissions have been estimated using a generalized emission factor of 0.03 grams per vehicle-mile (Bay Area Air Quality Management District 1996).

D.3 Data for Carbon Monoxide Dispersion Modeling

State and federal vehicle emission controls have eliminated violations of carbon monoxide standards from most urban areas in California. The potential for carbon monoxide problems is greatest at locations experiencing severe traffic congestion. Traffic analyses prepared for this DEIS indicate no significant impacts from traffic associated with added personnel at any of the three alternative receiving installations. Consequently, carbon monoxide dispersion modeling analyses were preformed for limited roadway networks at the major access gates for each alternative. The CALINE4 model (Benson 1989) was used for all dispersion modeling analyses. Afternoon peak hour traffic conditions were modeled and then extrapolated to potential 8-hour average conditions.

Dispersion modeling for NAWS Point Mugu included Highway 1, the frontage road, North Mugu Road, Main Road, and Las Posas Road. Dispersion modeling for NAS Lemoore included State Route 198 and the main access road. Dispersion modeling for NAF El Centro included Evan Hewes Road and Forrester Road. Modeled receptor locations were 75 feet from the major intersection of interest.

The EMFAC7F vehicle emission rate program (California Air Resources Board 1992, 1993) was used to estimate carbon monoxide emission rates for vehicles operating on roadways in the study area. The equations used in the vehicle emission rate models incorporate coefficients representing speed-dependent patterns of vehicle idling, acceleration, cruising, and deceleration. The resulting vehicle emission rates do not represent a constant speed cruise condition. Instead, they represent a pattern of speed changes representing an overall average route speed. The amount of idling time inherent in the emission rate models increases from about 2 percent of travel time at 55 mph to 10 percent at 30 mph and to 48 percent at 5 mph (Smith and Aldrich 1977; Sculley 1989). This inherent pattern adequately accounts for congestion-related idling on most roadways that do not experience significant congestion or signalization delays.

The amount of vehicle idling occurring at congested or signalized intersections can exceed the amount of idling inherent in the vehicle emission rate models, even if low intersection approach speeds are assumed. To more adequately account for the amount of idling at congested intersections, special adjustments were made to the basic EMFAC7F emission rates for roadway links at the major intersection of interest.

The basic idle adjustment procedure uses the length of a modeled roadway link and the assumed average vehicle speed to determine the amount of idling time inherent in the associated EMFAC7F emission rate. This idling time value can then be compared to an estimate of expected actual delay time per vehicle (based on intersection delay analyses, level-of-service estimates, or signal cycle times). When the expected actual delay per vehicle exceeds the idling time accounted for in the vehicle emission rates, an excess idling emission rate increment can be calculated and added to the basic EMFAC7F rate.

Table D-43 presents generic idling adjustment analyses use for the CALINE4 modeling. Idling delays of 20 seconds per vehicle were assumed for NAWS Point Mugu and NAS Lemoore. An idling delay of 25 seconds was assumed for the NAF El Centro analysis.

The CALINE4 model was run using an averaging time of 60 minutes and a surface roughness factor of 50 centimeters. No settling or deposition velocities were used. A scale factor of 0.3048 was used to convert link and receptor coordinate units from feet to meters. All CALINE4 runs assumed a wind speed of 1.0 meters per second (2.2 mph), stable atmospheric conditions (stability class E and a horizontal wind direction fluctuation parameter of 10 degrees), and a mixing height limit of 50 meters (164 feet). Wind directions were varied in 10 degree increments to identify the situation producing the highest total pollutant concentration at each receptor location.

Actual CALINE4 input files are presented in Table D-44 (NAWS Point Mugu), Table D-45 (NAS Lemoore), and Table D-46 (NAF El Centro).

D.4 CLEAN AIR ACT CONFORMITY REQUIREMENTS

Section 176(c) of the Clean Air Act requires that federal agency actions be consistent with the Clean Air Act and with any approved air quality management plan (state implementation plan [SIP]). EPA adopted Clean Air Act conformity requirements in two stages: one rule for regional transportation plans, highway projects, and transit projects; and a second rule for other federal agency actions.

The conformity rule for highway and mass transit plans and projects was promulgated in the November 24, 1993 Federal Register (58 FR 62188-62216). The transportation conformity rule (40 CFR Part 93 Subpart A; duplicated in 40 CFR Part 51 Subpart T) applies to transportation plans and transportation projects that require action by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) under Title 23 USC or the Federal Transit Act. The transportation conformity rule defines a "transportation project" as a highway project or mass transit project. Federal agency actions affecting airports, harbors, or freight rail facilities would normally be subject to the general conformity rule, not the transportation conformity rule.

The conformity rule for general federal actions was promulgated in the November 30, 1993 Federal Register (58 FR 63214-63259), and became effective on January 31, 1994. The Navy's proposed realignment action is subject to the general conformity rule (40 CFR Part 93 Subpart B; duplicated in 40 CFR Part 51 Subpart W).

D.4.1 Purpose of the General Conformity Rule

The EPA general conformity rule requires federal agencies to analyze proposed actions according to standardized procedures and to provide a public review and comment process. The conformity determination process is intended to demonstrate that the proposed federal action:

- is consistent with plans for achieving federal air quality standards;
- will not cause or contribute to new violations of federal air quality standards;
- will not increase the frequency or severity of existing violations of federal air quality standards; and
- will not delay the timely attainment of federal air quality standards.

D.4.2 Applicability of the General Conformity Rule

The EPA general conformity rule applies to general federal actions affecting nonattainment areas and to designated maintenance areas (attainment areas that are close to nonattainment status and which are required to prepare an air quality maintenance plan). As noted previously, highway or mass transit projects that

require FHWA or FTA funding or approval will be subject to transportation conformity rule requirements rather than the EPA general conformity rule requirements. Analyses required by the general conformity rule must be performed for each nonattainment or maintenance pollutant and its relevant precursors.

Five categories of actions and projects are excluded from the general conformity rule requirements (40 CFR 93.153(d)):

- stationary sources requiring new source review (NSR) or prevention of significant deterioration (PSD) permits;
- direct emissions from remedial actions at Superfund (CERCLA) sites when the substantive requirements of NSR/PSD programs are met or when the action is otherwise exempted under provisions of CERCLA;
- initial and continuing actions in response to emergencies or disasters;
- alterations and additions to existing structures as specifically required by applicable environmental legislation or regulations; and
- various special studies and research investigation actions.

Conformity determinations are not required to address the emissions consequences of those portions of an action that are not reasonably foreseeable or are not quantifiable.

In addition, conformity determinations are not required when the annual direct and indirect emissions from the action will be less than the applicable "de minimis" thresholds (40 CFR 93.153(c)). Applicable demimimis levels vary by pollutant and the severity of nonattainment conditions (40 CFR 93.153(b)). The de minimis thresholds in carbon monoxide, sulfur dioxide, or nitrogen dioxide nonattainment areas are 100 tons per year of the relevant pollutant. The de minimis threshold in lead nonattainment areas is 25 tons per year.

The de minimis threshold in ozone nonattainment areas generally applies to both organic compound and nitrogen oxide emissions. The de minimis level varies according to severity of nonattainment: 100 tons per year in marginal or moderate nonattainment areas, 50 tons per year in serious nonattainment areas, 25 tons per year in severe nonattainment areas, and 10 tons per year in extreme nonattainment areas.

The de minimis threshold in PM_{10} nonattainment areas applies to identified PM_{10} precursors as well as to directly emitted PM_{10}. The de minimis level is 100 tons per year in moderate nonattainment areas and 70 tons per year in severe nonattainment areas.

The EPA conformity rule identifies several categories of actions that are presumed to result in no net emissions increase or in an emissions increase that will clearly be less than any applicable de minimis level. These types of activities are primarily routine administrative, planning, financial, property disposal, or property maintenance actions.

Regardless of the applicable de minimis level, conformity assessments are required for non-exempt "regionally significant" actions: direct and indirect emissions exceed 10 percent of the applicable SIP emissions inventory, regardless of numerical value.

Emission estimates summarized in Chapter 4 of the DEIS and documented in subsequent sections of this appendix demonstrate that Clean Air Act conformity determination requirements apply to the NAWS Point Mugu and NAS Lemoore alternatives. The NAF El Centro Alternative would have total conformity-related emissions that are below all relevant de minimis levels.

D.4.3 Responsibility for Conformity Determinations

The federal agency undertaking the action is responsible for preparing and issuing the conformity determination under the EPA conformity rules. Other federal, state, and local agencies have review and comment responsibility, but no agency has approval/denial authority over the conformity determination. However, a federal agency's conformity determination is subject to legal challenge.

D.4.4 Options for Demonstrating Conformity

Two types of technical analyses can be used to demonstrate clean air act conformity:

- dispersion modeling demonstrations for primary (i.e., directly emitted) pollutants to show that there will be no violations of federal ambient air quality standards; or

- emissions analyses that demonstrate that there will be no net emissions increase and that emissions will not interfere with the timely attainment and maintenance of federal ambient air quality standards.

Dispersion modeling demonstrations of conformity are not allowed for ozone nonattainment areas, and will seldom be feasible for other secondary pollutants (nitrogen dioxide and particulate matter). In addition, modeling may not be possible for some types of emission sources due to the lack of appropriate dispersion models. In general, dispersion modeling is most useful for carbon monoxide, lead, and sulfur dioxide nonattainment areas. Dispersion modeling may be useful in some PM_{10} nonattainment areas if secondary PM_{10} is not a significant contributor to nonattainment conditions.

If dispersion modeling is not used for the conformity demonstration, then the conformity demonstration requires either consistency with emission forecasts in SIP documents or identification of concurrent or prior emission reductions that will compensate for emission increases associated with a proposed action.

If EPA has not yet approved a SIP document submitted pursuant to the Clean Air Act Amendments of 1990, there are two basic options for demonstrating conformity.

- Conformity will be demonstrated if direct and indirect emissions from the action are fully offset through compensating emission reductions implemented through a federally enforceable mechanism (40 CFR 93.158(a)(2)).

- Alternatively, conformity can be demonstrated by showing that total direct and indirect emissions with the federal action do not exceed estimated future baseline scenario emissions. Future baseline scenario emissions are total direct and indirect emissions that would occur in future years if baseline (1990 or the nonattainment designation year) emission source activity levels remain constant in the geographic area affected by the federal action. The future baseline scenario represents a "no action" scenario projected to the maximum emissions year for the proposed action, to the attainment year mandated by the Clean Air Act, and to any other "milestone" years identified in the existing SIP (40 CFR 93.158(a)(5)(iv)(A)).

If EPA has approved SIP revisions pursuant to the 1990 Clean Air Act Amendments, any one of several options can be used for demonstrating conformity.

- Conformity is presumed if direct and indirect emissions from the activity are specifically identified and accounted for in the attainment or maintenance demonstration of a SIP approved after 1990 (40 CFR 93.158(a)(1)).

- Conformity will be demonstrated if direct and indirect emissions from the action are fully offset through compensating emission reductions implemented through a federally enforceable mechanism (40 CFR 93.158(a)(2) and 40 CFR 93.158(a)(5)(iii)).

- Conformity also can be demonstrated if the agency responsible for SIP preparation provides documentation that direct and indirect emissions associated with the federal agency action are accommodated within the emission forecasts contained in an approved SIP (40 CFR 93.158(a)(5)(i)(A)).

- Finally, if SIP conformity cannot be demonstrated by the procedures noted above, a conformity determination is possible only if the relevant air quality management agency notifies EPA that appropriate changes will be made in the applicable SIP documents. The air quality management agency must commit to a schedule for preparing an acceptable SIP amendment that accommodates the net increase in direct and indirect emissions from the federal action without causing any delay in the schedule for attaining the relevant federal ambient air quality standard (40 CFR 93.158(a)(5)(i)(B)).

All conformity determinations must also demonstrate that total direct and indirect emissions are consistent with all relevant requirements and milestones in the applicable SIP including:

- reasonable further progress schedules,
- assumptions specified in the attainment or maintenance demonstration, and
- SIP prohibitions, numerical emission limits, and work practice requirements.

D.5 Clean Air Act Conformity Determination, Realignment of E-2 Squadrons From NAS Miramar To NAWS Point Mugu

D.5.1 Applicability Analysis

NAWS Point Mugu is located in Ventura County, California. Most of Ventura County (including NAWS Point Mugu) is designated a severe ozone nonattainment area. As indicated subsequently in Table D-49, direct and indirect emissions of ozone precursors associated with the E-2 realignment exceed the *de minimis* threshold of 25 tons per year. Consequently, Clean Air Act conformity determination requirements apply to the E-2 realignment action.

Some emission sources associated with the E-2 realignment action are exempt from consideration under the general conformity rule. Exempt emission sources include stationary sources that require permits from the Ventura County Air Pollution Control District (VCAPCD) and emission sources that are not under Navy control.

Because NAWS Point Mugu already has most facilities required to support the E-2 realignment, relatively few new facilities will be constructed. In some cases, facilities that currently have permits from the VCAPCD may require modifications. Depending on the nature of the modification and the terms of existing VCAPCD permits, it may be necessary to amend existing air quality permits. Permits of an existing engine test cell and for existing aircraft maintenance facilities are the facilities most likely to require amendments to

existing permits. Facilities covered by existing, amended, or new VCAPCD permits are exempt from consideration in a conformity determination.

Some equipment associated with aircraft maintenance activities plus some equipment associated with aircraft flight operations may be subject to VCAPCD permit requirements. For some of this equipment, the Navy has the option of registering the equipment as a mobile source instead of having it permitted as a stationary source. For purposes of this conformity determination, all such equipment has been treated as permit-exempt mobile source equipment, and included in the conformity analysis.

Vehicle travel associated with added military and civilian personnel has been separated into base-related travel (work-related trips) and other household travel (shopping and other nonwork trips). Emissions associated with base-related travel are included in the conformity analysis. Emissions associated with off-base housing units (space heating, water heating, etc.) are not under Navy control, and are excluded from the conformity analysis.

D.5.2 Summary of Added Emissions

Conformity-related emission estimates for the E-2 realignment action are summarized in Table D-49A. The maximum annual conformity-related emissions will be 31.9 tons per year of reactive organic compounds and 49.2 tons per year of nitrogen oxides. These emission quantities will decline slightly after 1999 because construction activities will be complete and emissions from motor vehicles will continue to decline slightly each year. For simplicity, this conformity analysis assumes that conformity-related emissions from the E-2 realignment action remain constant after the year 2000.

D.5.3 Post-1990 Emission Reductions at NAWS Point Mugu

The 1994 ozone SIP for Ventura County uses 1990 as a base year. Emission forecasts in the ozone SIP assume a continuation of 1990 conditions for government aircraft operations based in Ventura county. In reality, the number of aircraft and personnel assigned to NAWS Point Mugu have been reduced since 1990. NAWS Point Mugu Environmental Division staff have identified 67 aircraft that no longer operate from NAWS Point Mugu (Table D-49C). These aircraft accounted for over one-half of all flight operations at NAWS Point Mugu during 1990. Flight operations by these 67 aircraft accounted for about 49 tons per year of reactive organic compound emissions and 48 tons per year of nitrogen oxide emissions in 1990. In addition, personnel reductions at NAWS Point Mugu amounted to 790 positions between 1990 and 1994.

The reductions in aircraft and personnel have resulted in emission reductions from a wide range of mobile and stationary sources at NAWS Point Mugu. As indicated in Table D-49B, the overall change in conformity-related emissions at NAWS Point Mugu between 1990 and 1996 amounts to a reduction of 54.3 tons per year in reactive organic compound emissions and a reduction of 65.9 tons per

year in nitrogen oxide emissions. These post-1990 emission reductions at NAWS Point Mugu exceed the conformity-related emission increases that will be generated by the E-2 realignment action.

D.5.4 Statement of Conformity

Post-1990 activity reductions at NAWS Point Mugu are not reflected in the emission forecasts used in the 1994 ozone SIP for Ventura County. Thus, actual emission reductions at NAWS Point Mugu between 1990 and 1996 can be considered surplus emission reductions not already used in the SIP for demonstrating attainment of the federal ozone standard. Since actual post-1990 emission reductions at NAWS Point Mugu exceed the additional emissions associated with the E-2 realignment action, emissions at NAWS Point Mugu will remain within the emission budgets contained in the 1994 ozone SIP for Ventura County. Consequently, the E-2 realignment action for NAWS Point Mugu conforms to the applicable SIP.

NAWS Point Mugu will follow VCAPCD procedures to ensure that new, relocated, or modified facilities and equipment meet applicable VCAPCD rules and regulations (including all SIP requirements) prior to facility construction or installation.

D.6 REFERENCES

Bay Area Air Quality Management District. 1996. *BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans.* San Francisco, California.

Benson, P. E. 1989. *CALINE4 - A Dispersion Model for Predicting Air Pollutant Concentrations Near Roadways.* 1984 Final Report with 1986 and 1989 Revisions. FHWA/CA/TL-84/15. California Department of Transportation. Sacramento, California.

California Air Resources Board. 1992. *BURDEN7C: Methodology for Estimating Emissions from On-road Motor Vehicles.* Technical Support Division. Sacramento, California.

California Air Resources Board. 1993. *Methodology for Estimating Emissions from On-road Motor Vehicles. Volume I: EMFAC7F; Volume II: WEIGHT(E7FWT); Volume III: BURDEN7F. Draft.* Technical Support Division. Sacramento, California.

California Department of Transportation. 1981. *The 1976-1980 Statewide Travel Survey.* Division of Transportation Planning. Sacramento, California.

California Department of Transportation. 1992. *1991 Statewide Travel Survey: Summary of Findings* Office of Traffic Improvement. Sacramento, California.

Castro, Tim. 1997a. *10-08-97 Fax, Annual Emissions From NAS Lemoore "Huffers" and TSE.* Sent by Tim Castro, Air Program Manager, NAS Lemoore.

Castro, Tim. 1997b. *10-08-97 Fax, Title V Emissions Inventory, Sep 96-Aug 97; TITVREP.XLS Printout.* Sent by Tim Castro, Air Program Manager, NAS Lemoore.

Hunn, Bruce D. (ed.). 1996. *Fundamentals of Building Energy Dynamics.* The MIT Press. Cambridge, Massachusetts

Institute of Transportation Engineers. 1991. *Trip Generation: an Informational Report.* 5th Edition. (Publication No. IR-016C.) Washington, DC.

Nokes, W. A. and P. E. Benson. 1985. *Development of Worst Case Meteorology Criteria.* (FHWA/CA/TL-85/14.) California Department of Transportation. Sacramento, California.

Sculley, R. D. 1989. "Vehicle Emission Rate Analysis for Carbon Monoxide Hot Spot Modeling." *JAPCA* 39(10):1334-1343.

Smith, M. and T. Aldrich. 1977. *Development of Revised Light-Duty-Vehicle Emission-Average Speed Relationships.* (EPA-460/3-77-011.) US Environmental Protection Agency, Office of Mobile Source Air Pollution Control. Ann Arbor, Michigan.

Thompson, S. 1997. *7-18-97 E-Mail memo re. Best Estimates for Time-In-Mode Values, F/A-18E/F Aircraft.* Sent by Lt. Steven Thompson, F/A-18E/F Fleet Introduction Team, NAS Lemoore.

US Environmental Protection Agency. 1985a. *Compilation of Air Pollutant Emission Factors. Volume I: Stationary Point and Area Sources.* 4th Edition. With Supplement A (1986), Supplement B (1988), Supplement C (1990), and Supplement D (1991). (AP-42.) Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina.

US Environmental Protection Agency. 1985b. *Compilation of Air Pollutant Emission Factors. Volume II: Mobile Sources.* 4th Edition. With Supplement A (1991). (AP-42.) Office of Mobile Sources. Ann Arbor, Michigan.

US Environmental Protection Agency. 1991. *Nonroad Engine and Vehicle Emission Study - Report.* (21A-2001.) Office of Air Radiation. Washington, DC. [PB9212696 from National Technical Information Service, Springfield, Virginia].

US Environmental Protection Agency. 1992. *Procedures for Emission Inventory Preparation. Volume IV: Mobile Sources.* EPA-450/4-81-126d (revised). Office of Mobile Sources. Ann Arbor, Michigan.

US Environmental Protection Agency. 1993. *Compilation of Air Pollutant Emission Factors. Fourth Edition. Volume I: Stationary Point and Area Sources, Supplement F.* (AP-42.) Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina.

US Environmental Protection Agency. 1995. *Compilation of Air Pollutant Emission Factors. Volume I: Stationary Point and Area Sources.* 5th Edition. (AP-42.) Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina.

US Federal Highway Administration. 1985. *Transportation Planning Data for Urbanized Areas Based on the 1980 Census.* (DOT-1-85-20.) Office of Highway Planning. Washington, DC.

US Navy. 1990. *Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines.* (AESO Report No. 6-90). Aircraft Environmental Support Office (AESO), Naval Aviation Depot - North Island. San Diego, California.

US Navy. 1994. *FEIS: Base Realignment of Naval Air Station Lemoore, California - Volumes I, II, and III.* Western Division, Naval Facilities Engineering Command. San Bruno, California.

US Navy. 1997a. *Baseline Emission Reduction Study.* NAWS Point Mugu Environmental Division.

US Navy. 1997b. *Emissions Associated With Aircraft Removed From Point Mugu Between 1990 and 1996.* NAWS Point Mugu Environmental Division.

US Navy. 1997c. *Gaseous and Particulate Emission Indexes for the F414 Turbofan Engine - Draft - Revised.* (AESO Memo Report No. 9725A). Aircraft Environmental Support Office (AESO), Naval Aviation Depot - North Island. San Diego, California.

US Navy. 1997d. *MCAS Miramar Conformity Analysis, Volumes I and II.* Southwest Division. San Diego, California.

US Navy. 1997e. *Revised Emissions From All Sources for NAWS Point Mugu for 1990 and 1996.* NAWS Point Mugu Environmental Division.

WeatherDisc Associates. 1990. *Worldwide Airfield Summaries (TD-9647). World WeatherDisc Version 2.1.* WeatherDisc Associates, Inc., Seattle, Washington.

Wyle Research. 1994. *Aircraft Noise Study for Naval Air Station Lemoore, California.* (WR 94-17). Arlington, Virginia.

This page intentionally left blank.

Construction Emissions Analysis

TABLE D-1. ESTIMATED CONSTRUCTION SITE ACREAGES FOR E-2 REALINGMENT ALTERNATIVES

ALTERNATIVE	FACILITY	BUILDING SQ FT	SITE MULTIPLIER	GROSS SITE ACRES	PRIMARY CONSTRUCTION YEAR
NAWS PT MUGU	HANGAR	7,000	1.25	0.20	1998
	AVIONICS SHOP	10,000	2	0.46	1998
	VEHICLE PARKING	123,750	1.1	3.13	1998
	OPERATIONAL TRAINER	9,644	2	0.44	1998
	1998 SUBTOTAL	150,394		4.23	1998
NAS LEMOORE	HANGARS	91,811	1.25	2.63	1998
	AIRCRAFT WASHRACK	30,600	1.25	0.88	1998
	PARKING APRON	397,350	1.1	10.03	1998
	POWER CHECK PAD	11,997	1.25	0.34	1998
	ENGINE MAINTENANCE	10,000	2	0.46	1998
	TEST CELL	7,065	1.5	0.24	1998
	AVIONICS SHOP	4,500	2	0.21	1998
	AIRFRAME SHOP	23,491	1.5	0.81	1998
	INSTRUCTION BUILDING	30,346	1.5	1.04	1998
	OPERATIONAL TRAINER	9,644	2	0.44	1998
	AEWWINGPAC BUILDING	14,000	1.5	0.48	1998
	VEHICLE PARKING	165,000	1.1	4.17	1998
	1998 SUBTOTAL	795,804		21.75	1998
	BEQ	110,760	1.5	3.81	1999
	CHILD CENTER	11,035	2	0.51	1999
	YOUTH CENTER	4,000	2	0.18	1999
	1999 SUBTOTAL	125,795		4.50	1999

TABLE D-1. ESTIMATED CONSTRUCTION SITE ACREAGES FOR E-2 REALINGMENT ALTERNATIVES

ALTERNATIVE	FACILITY	BUILDING SQ FT	SITE MULTIPLIER	GROSS SITE ACRES	PRIMARY CONSTRUCTION YEAR
NAF EL CENTRO	HANGARS	91,811	1.25	2.63	1998
	PARKING APRON	397,350	1.1	10.03	1998
	SUPPLY WAREHOUSE	40,000	1.25	1.15	1998
	ENGINE MAINTENANCE	20,000	1.5	0.69	1998
	TEST CELL	7,065	1.5	0.24	1998
	GSE STORAGE	11,555	1.25	0.33	1998
	GSE MAINTENANCE	8,445	1.25	0.24	1998
	AVIONICS SHOP	16,302	1.5	0.56	1998
	AIRFRAME SHOP	14,380	1.5	0.50	1998
	AEWWINGPAC BUILDING	14,000	1.5	0.48	1998
	INSTRUCTION BUILDING	30,346	1.5	1.04	1998
	OPERATIONAL TRAINER	9,644	2	0.44	1998
	VEHICLE PARKING	123,750	1.1	3.13	1998
	1998 SUBTOTAL	784,648		21.47	1998
	BEQ	110,760	1.5	3.81	1999
	CHILD CENTER	11,035	2	0.51	1999
	1999 SUBTOTAL	121,795		4.32	1999

TABLE D-2. CONSTRUCTION ASSUMPTIONS FOR 1998 PROJECTS, NAWS POINT MUGU ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation	Facility Construction
PM10 portion of fugitive TSP	==>	40%	40%
area subject to surface disturbance	==>	4.2 acres	0.8 acres
typical area disturbed on any one day	==>	4.2 acres	0.8 acres
duration of activity phase on any area	==>	30 days	90 days
dust control program effectiveness	==>	50%	50%
Nominal Construction Period by Phase:		30 days	90 days
Nominal Overall Construction Period:		120 days	

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	==>				
wheeled tractor	==>	1	4	1	2
cold planers and wheeled dozers	==>	1	4		
scraper	==>				
motor grader	==>	1	4		
wheeled loader	==>	2	6	1	2
track-type loader	==>				
off-highway truck	==>	2	8	1	4
static and vibratory rollers	==>	1	2	1	2
excavators/crawlers, trenchers	==>	1	4		
concrete pavers, asphalt pavers	==>	1	6	1	2
cranes and miscellaneous equipment	==>			1	4
Total Number of Construction Vehicles:		10		6	
Construction Equipment Fuel Use Estimate, gallons/day:		434		107	
Mean Fuel Consumption Rate, gallons/vehicle-hour:		8.3		6.7	
Cumulative Hours of Heavy Equipment Use:		1,560		1,440	
Total Cumulative Hours of Heavy Equipment Use:			3,000		

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

TABLE D-3. 1998 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAWS POINT MUGU ALTERNATIV

Construction Phase	Construction Period Emissions (tons)				
	ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	0.1	2.0	1.0	0.2	1.5
Facility Construction Emissions	0.1	1.6	0.9	0.2	0.9
Total Construction Period Emissions	0.3	3.6	1.9	0.3	2.4

Nonimal Site and Foundation Preparation Period:	30 days
Nominal Facility Construction Period:	90 days
Nominal Acre-Days for Site and Foundation Preparation:	126 acre-days
Nominal Acre-Days for Facility Construction:	72 acre-days
Equipment Use for Site and Foundation Preparation:	1,560 vehicle-hours
Equipment Use for Facility Construction:	1,440 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	12.38 hours/acre-day
Normalized Equipment Use, Facility Construction:	20.00 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

Data Source: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume I [section 11.2.4] and Volume II [section II-7]).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE D-4. CONSTRUCTION ASSUMPTIONS FOR 1998 PROJECTS, NAS LEMOORE ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation	Facility Construction
PM10 portion of fugitive TSP	⇒	40%	40%
area subject to surface disturbance	⇒	22 acres	3.5 acres
typical area disturbed on any one day	⇒	11 acres	3.5 acres
duration of activity phase on any area	⇒	45 days	120 days
dust control program effectiveness	⇒	50%	50%
Nominal Construction Period by Phase:		90 days	120 days
Nominal Overall Construction Period:		210 days	

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	⇒				
wheeled tractor	⇒	1	4	1	2
cold planers and wheeled dozers	⇒	1	4		
scraper	⇒	2	4		
motor grader	⇒	2	4		
wheeled loader	⇒	2	6	1	2
track-type loader	⇒				
off-highway truck	⇒	4	8	3	6
static and vibratory rollers	⇒	1	2	1	2
excavators/crawlers, trenchers	⇒	2	4		
concrete pavers, asphalt pavers	⇒	2	6	1	2
cranes and miscellaneous equipment	⇒			2	4
Total Number of Construction Vehicles:		17			9
Construction Equipment Fuel Use Estimate, gallons/day:		842			329
Mean Fuel Consumption Rate, gallons/vehicle-hour:		9.4			9.7
Cumulative Hours of Heavy Equipment Use:		8,100			4,080
Total Cumulative Hours of Heavy Equipment Use:				12,180	

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

TABLE D-5. 1998 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAS LEMOORE ALTERNATIVE

Construction Phase	Construction Period Emissions (tons) ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	0.7	11.2	5.0	1.2	11.7
Facility Construction Emissions	0.4	6.0	2.9	0.6	5.0
Total Construction Period Emissions	1.1	17.2	7.9	1.8	16.7

Nonimal Site and Foundation Preparation Period:	90 days
Nominal Facility Construction Period:	120 days
Nominal Acre-Days for Site and Foundation Preparation:	990 acre-days
Nominal Acre-Days for Facility Construction:	420 acre-days
Equipment Use for Site and Foundation Preparation:	8,100 vehicle-hours
Equipment Use for Facility Construction:	4,080 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	8.18 hours/acre-day
Normalized Equipment Use, Facility Construction:	9.71 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

Data Source: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume I [section 11.2.4] and Volume II [section II-7]).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE D-6. CONSTRUCTION ASSUMPTIONS FOR 1999 PROJECTS, NAS LEMOORE ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation	Facility Construction
PM10 portion of fugitive TSP	==>	40%	40%
area subject to surface disturbance	==>	4.5 acres	1.6 acres
typical area disturbed on any one day	==>	4.5 acres	1.6 acres
duration of activity phase on any area	==>	20 days	75 days
dust control program effectiveness	==>	50%	50%
Nominal Construction Period by Phase:		20 days	75 days
Nominal Overall Construction Period:		95 days	

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	==>				
wheeled tractor	==>			1	2
cold planers and wheeled dozers	==>	1	4		
scraper	==>				
motor grader	==>	1	4		
wheeled loader	==>	2	4		
track-type loader	==>				
off-highway truck	==>	2	6	2	4
static and vibratory rollers	==>			1	2
excavators/crawlers, trenchers	==>	1	4		
concrete pavers, asphalt pavers	==>			1	2
cranes and miscellaneous equipment	==>			1	4
Total Number of Construction Vehicles:		7		6	
Construction Equipment Fuel Use Estimate, gallons/day:		309		154	
Mean Fuel Consumption Rate, gallons/vehicle-hour:		9.7		8.5	
Cumulative Hours of Heavy Equipment Use:		640		1,350	
Total Cumulative Hours of Heavy Equipment Use:			1,990		

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

TABLE D-7. 1999 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAS LEMOORE ALTERNATIVE

Construction Phase	Construction Period Emissions (tons)				
	ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	0.1	0.9	0.4	0.1	1.0
Facility Construction Emissions	0.1	1.8	1.0	0.2	1.4
Total Construction Period Emissions	0.2	2.7	1.4	0.3	2.5

Nonimal Site and Foundation Preparation Period:	20 days
Nominal Facility Construction Period:	75 days
Nominal Acre-Days for Site and Foundation Preparation:	90 acre-days
Nominal Acre-Days for Facility Construction:	120 acre-days
Equipment Use for Site and Foundation Preparation:	640 vehicle-hours
Equipment Use for Facility Construction:	1.350 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	7.11 hours/acre-day
Normalized Equipment Use, Facility Construction:	11.25 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

Data Source: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume I [section 11.2.4] and Volume II [section II-7]).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE D-8. CONSTRUCTION ASSUMPTIONS FOR 1998 PROJECTS, NAF EL CENTRO ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation	Facility Construction
PM10 portion of fugitive TSP	⇒	40%	40%
area subject to surface disturbance	⇒	21.5 acres	3.5 acres
typical area disturbed on any one day	⇒	11 acres	3.5 acres
duration of activity phase on any area	⇒	50 days	120 days
dust control program effectiveness	⇒	50%	50%
Nominal Construction Period by Phase:		98 days	120 days
Nominal Overall Construction Period:		218 days	

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	⇒				
wheeled tractor	⇒	1	4	1	2
cold planers and wheeled dozers	⇒	1	4		
scraper	⇒	2	4		
motor grader	⇒	2	4		
wheeled loader	⇒	2	6	1	2
track-type loader	⇒				
off-highway truck	⇒	4	8	3	6
static and vibratory rollers	⇒	1	2	1	2
excavators/crawlers, trenchers	⇒	2	4		
concrete pavers, asphalt pavers	⇒	2	6	1	2
cranes and miscellaneous equipment	⇒			2	4
Total Number of Construction Vehicles:		17			9
Construction Equipment Fuel Use Estimate, gallons/day:		842			329
Mean Fuel Consumption Rate, gallons/vehicle-hour:		9.4			9.7
Cumulative Hours of Heavy Equipment Use:		8,795			4,080
Total Cumulative Hours of Heavy Equipment Use:			12,875		

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

TABLE D-9. 1998 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAF EL CENTRO ALTERNATIVE

Construction Phase	Construction Period Emissions (tons) ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	0.8	12.2	5.4	1.3	12.7
Facility Construction Emissions	0.4	6.0	2.9	0.6	5.0
Total Construction Period Emissions	1.1	18.2	8.3	1.9	17.7

Nonimal Site and Foundation Preparation Period:	98 days
Nominal Facility Construction Period:	120 days
Nominal Acre-Days for Site and Foundation Preparation:	1,075 acre-days
Nominal Acre-Days for Facility Construction:	420 acre-days
Equipment Use for Site and Foundation Preparation:	8,795 vehicle-hours
Equipment Use for Facility Construction:	4,080 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	8.18 hours/acre-day
Normalized Equipment Use, Facility Construction:	9.71 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

Data Source: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume I [section 11.2.4] and Volume II [section II-7]).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE D-10. CONSTRUCTION ASSUMPTIONS FOR 1999 PROJECTS, NAF EL CENTRO ALTERNATIVE

FUGITIVE DUST DATA INPUT SECTION:		Site & Foundation Preparation	Facility Construction
PM10 portion of fugitive TSP	==>	40%	40%
area subject to surface disturbance	==>	4.3 acres	1.5 acres
typical area disturbed on any one day	==>	4.3 acres	1.5 acres
duration of activity phase on any area	==>	20 days	75 days
dust control program effectiveness	==>	50%	50%
Nominal Construction Period by Phase:		20 days	75 days
Nominal Overall Construction Period:		95 days	

CONSTRUCTION VEHICLE DATA INPUT SECTION:		Site & Foundation Preparation		Facility Construction	
		Number of Vehicles	Hours per Day	Number of Vehicles	Hours per Day
track-type tractor	==>				
wheeled tractor	==>			1	2
cold planers and wheeled dozers	==>	1	4		
scraper	==>				
motor grader	==>	1	4		
wheeled loader	==>	2	4		
track-type loader	==>				
off-highway truck	==>	2	6	2	4
static and vibratory rollers	==>			1	2
excavators/crawlers, trenchers	==>	1	4		
concrete pavers, asphalt pavers	==>			1	2
cranes and miscellaneous equipment	==>			1	4
Total Number of Construction Vehicles:		7		6	
Construction Equipment Fuel Use Estimate, gallons/day:		309		154	
Mean Fuel Consumption Rate, gallons/vehicle-hour:		9.7		8.5	
Cumulative Hours of Heavy Equipment Use:		640		1,350	
Total Cumulative Hours of Heavy Equipment Use:		1,990			

Notes: The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

TABLE D-11. 1999 CONSTRUCTION SEASON EMISSIONS SUMMARY, NAF EL CENTRO ALTERNATIVE

Construction Phase	Construction Period Emissions (tons)				
	ROG	NOx	CO	SOx	PM10
Site Preparation Emissions	0.1	0.9	0.4	0.1	1.0
Facility Construction Emissions	0.1	1.8	1.0	0.2	1.4
Total Construction Period Emissions	0.2	2.7	1.4	0.3	2.4

Nonimal Site and Foundation Preparation Period:	20 days
Nominal Facility Construction Period:	75 days
Nominal Acre-Days for Site and Foundation Preparation:	86 acre-days
Nominal Acre-Days for Facility Construction:	113 acre-days
Equipment Use for Site and Foundation Preparation:	640 vehicle-hours
Equipment Use for Facility Construction:	1,350 vehicle-hours
Normalized Equipment Use, Site & Foundation Preparation:	7.44 hours/acre-day
Normalized Equipment Use, Facility Construction:	12.00 hours/acre-day

Notes: ROG = reactive organic compounds
NOx = oxides of nitrogen
CO = carbon monoxide
PM10 = inhalable particulate matter
SOx = sulfur oxides

The PM10 fraction of fugitive dust is based on typical silt plus clay content of project area soil types (mostly clay loams).
Areas subject to surface disturbance include the entire construction site during site and foundation preparation; facility footprints and areas paved early in the construction process are excluded from the disturbed area during actual facility construction.
Construction vehicle numbers are estimated from construction site sizes and the nature of individual construction projects.
Dust control program effectiveness assumes implementation of normal fugitive dust control practices.

Data Source: Emission rate data and procedures from U.S. Environmental Protection Agency 1985 (AP-42, Volume I [section 11.2.4] and Volume II [section II-7]).
Diesel vehicle exhaust TOG emission rates converted to ROG emission rates using 97.58% factor obtained from California Air Resources Board.

TABLE D-12. CONSTRUCTION EQUIPMENT EMISSION FACTORS

DIESEL-FUELED EQUIPMENT EXHAUST EMISSION RATE DATABASE:

EQUIPMENT TYPE	EMISSION RATE, GRAMS/HOUR				
	ROG	CO	NOx	PM10	SOx
track-type tractor	53.73	157.01	570.70	50.70	62.30
wheeled tractor	83.20	1,622.77	575.84	61.50	40.90
cold planers and wheeled dozers	84.74	816.81	1,889.16	75.00	158.00
scraper	125.05	568.19	1,740.74	184.00	210.00
motor grader	17.63	68.46	324.43	27.70	39.00
wheeled loader	110.43	259.58	858.19	77.90	82.50
track-type loader	43.47	91.15	375.22	26.40	34.40
off-highway truck	84.74	816.81	1,889.16	116.00	206.00
static and vibratory rollers	29.84	137.97	392.90	22.70	30.50
excavators/crawlers, trenchers	67.67	306.37	767.30	63.20	64.70
concrete pavers, asphalt pavers	67.67	306.37	767.30	63.20	64.70
cranes and miscellaneous equipment	67.67	306.37	767.30	63.20	64.70

EQUIPMENT FUEL USE RATE DATABASE:

EQUIPMENT TYPE	FUEL USE (gal/hr)
track-type tractor	4.4
wheeled tractor	2.9
cold planers and wheeled dozers	14.6
scraper	14.8
motor grader	2.8
wheeled loader	5.8
track-type loader	2.4
off-highway truck	14.6
static and vibratory rollers	2.1
excavators/crawlers, trenchers	4.5
concrete pavers, asphalt pavers	4.5
cranes and miscellaneous equipment	4.5

This page intentionally left blank.

E-2 Aircraft Emissions Analysis

TABLE D-13. DATA USED TO ESTIMATE EMISSIONS FROM ADDED E-2 FLIGHT OPERATIONS

Aircraft Type	Number of Engines	Engine Models Used For Emissions Analysis	Annual Flight Operations	Flight Activity	Fraction of Annual Flight Operations	Flight Mode	Engine Power or Thrust Setting	Total Annual Flight Operations	Average Daily Flight Operations		Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow)				
									Spring - Fall	Winter			Total Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
E-2	2	T56-A-16, T56-A-7	34,100	Departure	10.70%	Taxi out	G Idle 1	3,650	10.7	8.0	19.0	599	22.32	3.53	30.11	0.40	2.92
						Takeoff	Military	3,650	10.7	8.0	0.5	2,219	0.16	10.45	0.65	0.40	1.78
						Climbout	100%	3,650	10.7	8.0	2.5	2,136	0.14	10.29	0.68	0.40	1.57
				Arrival	10.70%	Approach	75%	3,650	10.7	8.0	5.6	1,996	0.19	9.93	0.42	0.40	2.85
						Taxi in	G Idle 1	3,650	10.7	8.0	7.0	599	22.32	3.53	30.11	0.40	2.92
				Touch-and-Go	3.23%	Approach	75%	550	1.6	1.2	4.5	1,996	0.19	9.93	0.42	0.40	2.85
						Climbout	100%	550	1.6	1.2	2.3	2,136	0.14	10.29	0.68	0.40	1.57
						Circle	75%	550	1.6	1.2	2.3	1,996	0.19	9.93	0.42	0.40	2.85
				FCLP	70.38%	Approach	75%	12,000	35.0	26.4	1.0	1,996	0.19	9.93	0.42	0.40	2.85
						Climbout	100%	12,000	35.0	26.4	1.6	2,136	0.14	10.29	0.68	0.40	1.57
						Circle	75%	12,000	35.0	26.4	1.4	1,996	0.19	9.93	0.42	0.40	2.85
				GCA Box	4.99%	Approach	75%	850	2.5	1.9	4.9	1,996	0.19	9.93	0.42	0.40	2.85
						Climbout	100%	850	2.5	1.9	3.7	2,136	0.14	10.29	0.68	0.40	1.57
						Circle	75%	850	2.5	1.9	7.1	1,996	0.19	9.93	0.42	0.40	2.85
E-2 Subtotal below 3,000 feet					100.00%			34,100	99.6	75.0							

TABLE D-13. DATA USED TO ESTIMATE EMISSIONS FROM ADDED E-2 FLIGHT OPERATIONS

Notes:

FLCP = field carrier landing practice

GCA = ground controlled approach

G Idle 1 = low speed ground idle

Estimates of added flight operations for E-2 aircraft are based on 3,650 sorties per year, with the number of pattern events based on data from the NAS Lemoore BRAC-93 EIS.

Departures and arrivals each represent a single flight operation; touch-and-go, FCLP, and GCA box patterns each represent two flight operations (an approach and a climbout).

Flight operation totals are the sum of approach mode and takeoff/climbout mode numbers.

Time-in-mode estimates for E-2 operations below 3,000 feet modified from EPA default values based on flight profile data from Wyle Research (1994).

Circle time for repeated pattern operations (touch-and-go, FLCP, GCA) assumed to occur below 3,000 feet.

Engine power setting assumptions based on data from Navy Aircraft Environmental Support Office (AESO) personnel, NAS Lemoore personnel, EPA 1985, and EPA 1992.

Approach and circle mode power settings shown for E-2 aircraft are settings for available emission rates; actual flight mode settings are 40% for approach and 50% for circle modes.

Aircraft engine emission rates based on data from AESO Report 6-90, EPA 1985, and EPA 1992.

Taxi/idle times assume low speed ground idle.

Approach time-in-mode for direct arrivals is a weighted mean of straight-in approaches and overhead break approaches.

Approach time-in-mode for touch-and-go patterns assumes an overhead break approach pattern.

Particulate matter emission rates for E-2 aircraft are based on T56-A-7 engine data from EPA 1992.

Sulfur oxide emissions assume a fixed emission rate of 0.4 pounds per 1,000 pounds of fuel (0.02% fuel sulfur content).

Typical day operations assume 80% of annual operations during spring through fall (274 days) and 20% of annual operations during winter (91 days).

All values independently rounded for display after calculation.

Data Sources:

Wyle Research, 1994. Aircraft Noise Study for Naval Air Station Lemoore, California (WR 94-17).

U.S. Navy, 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO Report No. 6-90).

U.S. Environmental Protection Agency, 1992. Procedures for Emission Inventory Preparation. Volume IV: Mobile Sources (EPA-450/4-81-026d(revised)).

TABLE D-14. ESTIMATED EMISSIONS FROM ADDED E-2 FLIGHT OPERATIONS

Aircraft Type	Flight Activity	Flight Mode	Average Daily Summer Emissions (pounds/day)					Average Daily Winter Emissions (pounds/day)					Total Emissions from Annual Flight Operations (tons/year)				
			Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
E-2	Departure	Taxi out	90.6	14.3	122.2	1.6	11.9	67.7	10.7	91.4	1.2	8.9	15.45	2.44	20.85	0.28	2.02
		Takeoff	0.1	4.1	0.3	0.2	0.7	0.0	3.1	0.2	0.1	0.5	0.01	0.71	0.04	0.03	0.12
		Climbout	0.3	19.6	1.3	0.8	3.0	0.2	14.7	1.0	0.6	2.2	0.05	3.34	0.22	0.13	0.51
	Arrival	Approach	0.8	39.6	1.7	1.6	11.4	0.6	29.6	1.3	1.2	8.5	0.13	6.75	0.29	0.27	1.94
		Taxi in	33.4	5.3	45.0	0.6	4.4	25.0	3.9	33.7	0.4	3.3	5.69	0.90	7.68	0.10	0.74
	Touch-and-Go	Approach	0.1	4.8	0.2	0.2	1.4	0.1	3.6	0.2	0.1	1.0	0.02	0.82	0.03	0.03	0.23
		Climbout	0.0	2.7	0.2	0.1	0.4	0.0	2.0	0.1	0.1	0.3	0.01	0.46	0.03	0.02	0.07
		Circle	0.0	2.4	0.1	0.1	0.7	0.0	1.8	0.1	0.1	0.5	0.01	0.42	0.02	0.02	0.12
	FCLP	Approach	0.4	23.1	1.0	0.9	6.6	0.3	17.4	0.7	0.7	5.0	0.08	3.96	0.17	0.16	1.14
		Climbout	0.6	41.0	2.7	1.6	6.3	0.4	30.9	2.0	1.2	4.7	0.10	7.03	0.46	0.27	1.07
		Circle	0.6	32.4	1.4	1.3	9.3	0.5	24.4	1.0	1.0	7.0	0.11	5.55	0.23	0.22	1.59
	GCA Box	Approach	0.2	8.1	0.3	0.3	2.3	0.1	6.2	0.3	0.2	1.8	0.03	1.38	0.06	0.06	0.39
		Climbout	0.1	6.8	0.4	0.3	1.0	0.1	5.2	0.3	0.2	0.8	0.02	1.15	0.08	0.04	0.18
		Circle	0.2	11.7	0.5	0.5	3.4	0.2	8.9	0.4	0.4	2.6	0.04	1.99	0.08	0.08	0.57
E-2 below 3,000 feet			127.3	215.9	177.3	10.0	62.7	95.2	162.4	132.6	7.5	47.1	21.7	36.9	30.2	1.7	10.7

Notes:

FLCP = field carrier landing practice

GCA = ground controlled approach

G Idle 1 = low speed ground idle

Typical day operations assume 80% of annual operations during spring through fall (274 days) and 20% of annual operations during winter (91 days).

All values independently rounded for display after calculation.

Data Sources:

Wyle Research. 1994. Aircraft Noise Study for Naval Air Station Lemoore, California (WR 94-17).

U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO Report No. 6-90).

U.S. Environmental Protection Agency. 1992. Procedures for Emission Inventory Preparation. Volume IV: Mobile Sources (EPA-450/4-81-026d(revised)).

TABLE D-15. ESTIMATED EMISSIONS FROM E-2 ENGINE RUN-UPS AND TEST CELL RUN-UPS

Run-Up Type	Engine Models Used For Emissions Analysis	Annual Run-Up Events	Engine Mode	Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow)					Total Emissions from Annual Engine Ru-Ups (tons/year)				
						Total Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
In-Frame, Long Test	T56-A-16, T56-A-7	826	G Idle 1	10	599	22.32	3.53	30.11	0.40	2.92	0.92	0.15	1.24	0.02	0.12
			75%	15	1,996	0.19	9.93	0.42	0.40	2.85	0.04	2.05	0.09	0.08	0.59
			Military	5	2,219	0.16	10.45	0.65	0.40	1.78	0.01	0.80	0.05	0.03	0.14
										Subtotal:	0.97	2.99	1.38	0.13	0.84
In-Frame, Short Test	T56-A-16, T56-A-7	208	G Idle 1	8	599	22.32	3.53	30.11	0.40	2.92	0.19	0.03	0.25	0.00	0.02
			F Idle	8	836	1.10	6.52	4.54	0.40	2.92	0.01	0.08	0.05	0.00	0.03
			75%	2	1,996	0.19	9.93	0.42	0.40	2.85	0.00	0.07	0.00	0.00	0.02
			100%	1.6	2,136	0.14	10.29	0.68	0.40	1.57	0.00	0.06	0.00	0.00	0.01
			Military	0.4	2,219	0.16	10.45	0.65	0.40	1.78	0.00	0.02	0.00	0.00	0.00
										Subtotal:	0.20	0.25	0.31	0.01	0.09
Test Cell	T56-A-16, T56-A-7	312	F Idle	10	836	1.10	6.52	4.54	0.40	2.92	0.02	0.14	0.10	0.01	0.06
			75%	15	1,996	0.19	9.93	0.42	0.40	2.85	0.01	0.77	0.03	0.03	0.22
			100%	10	2,136	0.14	10.29	0.68	0.40	1.57	0.01	0.57	0.04	0.02	0.09
			Military	5	2,219	0.16	10.45	0.65	0.40	1.78	0.00	0.30	0.02	0.01	0.05
										Subtotal:	0.05	1.79	0.19	0.07	0.42
Total In-Frame Run-Ups										Run-Ups:	1.17	3.24	1.69	0.14	0.93
Combined In-Frame Run-Ups and Test Cell										Total:	1.22	5.03	1.88	0.22	1.36

Notes:

In-frame long test engine run-ups: 2.15 per engine per aircraft per month (MCAS Miramar Conformity Analysis, Volume I, Table B-5: 1990 test rate).

In-frame short test engine run-ups: 13 per aircraft per year (MCAS Miramar Conformity Analysis, Volume II, Table B-1: 1990 test rate).

In-frame run-up time-in-mode assumptions from MCAS Miramar Conformity Analysis (Volume I, Table B-5; Volume I, Table B-1).

Test cell run-ups: assume 6 engine tests per week (E-2 engines plus additional T-56 engines from MCAS Miramar KC-130 aircraft).

Test cell time-in-mode assumptions: similar to in-frame long test, except flight idle instead of ground idle and with 10 minutes at 100% setting added.

Miscellaneous Mobile and Stationary Sources

TABLE D-16. ESTIMATED EMISSIONS FROM TOW TRACTORS AND RELATED AIRCRAFT SUPPORT EQUIPMENT

GSE Vehicle Type	Vehicle Fuel	Typical In-use HP Load Rating	Aircraft Event	Annual Number of Events	Vehicle Use Per Event (minutes)	Emission Rate (grams per horsepower-hour) Total Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Total Emissions from Annual GSE Equipment Use (tons/year) Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
Misc. equip.	Gasoline	70	Departures	3,650	15	12.22	5.16	258.7	0.027	0.06	0.86	0.36	18.22	0.002	0.004
		70	Arrivals	3,650	15	12.22	5.16	258.7	0.027	0.06	0.86	0.36	18.22	0.002	0.004
Tow Tractors	Diesel	80	Departures	3,650	15	1.6	14.0	6.06	0.93	1.6	0.13	1.13	0.49	0.07	0.13
		80	Arrivals	3,650	15	1.6	14.0	6.06	0.93	1.6	0.13	1.13	0.49	0.07	0.13
TOTALS											2.0	3.0	37.4	0.2	0.3

Notes:
In use horsepower load values rounded from EPA default averages of rated horsepower times typical load factor.
Gasoline-fueled equipment emission factors reflect EPA in-use adjustments.
Vehicle use per aircraft event are generalized estimates, including a time allowance for aircraft refueling after landings.

Data Source: U.S. EPA, 1991. Nonroad Engine and Vehicle Emission Study - Report. (ANR-443). NITS PB92126960.

TABLE D-17. EMISSION RATES FOR MISCELLANEOUS STATIONARY AND MOBILE SOURCES

SOURCE CATEGORY	TYPICAL SIZE OR QUANTITY	SIZE UNITS	STANDARD EMISSION FACTORS					EMISSION FACTOR UNITS	EMISSION FACTOR DATA SOURCE
			ROG	NOx	CO	SOx	PM10		
JP-5 AIRCRAFT FUEL TRANSFERS, 40 F	1	MILLION GALLONS	19.26	0.00	0.00	0.00	0.00	LBS/MILLION GAL	AP-42, SECT 5.2 & 7.1; 40 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 50 F	1	MILLION GALLONS	27.63	0.00	0.00	0.00	0.00	LBS/MILLION GAL	AP-42, SECT 5.2 & 7.1; 50 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 60 F	1	MILLION GALLONS	38.39	0.00	0.00	0.00	0.00	LBS/MILLION GAL	AP-42, SECT 5.2 & 7.1; 60 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 70 F	1	MILLION GALLONS	48.75	0.00	0.00	0.00	0.00	LBS/MILLION GAL	AP-42, SECT 5.2 & 7.1; 70 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 80 F	1	MILLION GALLONS	65.24	0.00	0.00	0.00	0.00	LBS/MILLION GAL	AP-42, SECT 5.2 & 7.1; 80 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 90 F	1	MILLION GALLONS	89.68	0.00	0.00	0.00	0.00	LBS/MILLION GAL	AP-42, SECT 5.2 & 7.1; 90 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 100 F	1	MILLION GALLONS	121.63	0.00	0.00	0.00	0.00	LBS/MILLION GAL	AP-42, SECT 5.2 & 7.1; 100 DEG F
NATURAL GAS BOILER, HANGAR	6.3	MILLION BTU/HR	3.83	81.00	61.00	0.60	12.00	LBS/MILLION SCF	AP-42, SECT 1.4 (<10 MMBTU, LOW NOx)
NATURAL GAS BOILER, BEQ	8.4	MILLION BTU/HR	3.83	81.00	61.00	0.60	12.00	LBS/MILLION SCF	AP-42, SECT 1.4 (<10 MMBTU, LOW NOx)
OFFICE/SHOP BLDG NATURAL GAS USE	1	MILLION BTU/HR	3.83	81.00	61.00	0.60	12.00	LBS/MILLION SCF	AP-42, SECT 1.4 (<10 MMBTU, LOW NOx)
RESIDENTIAL NATURAL GAS USE	<0.3	MILLION BTU/HR	7.26	94.00	40.00	0.60	11.18	LBS/MILLION SCF	AP-42, SECT 1.4 (<0.3 MMBTU)
AIRCRAFT PAINTING	3.4	GALLONS/YR/PLANE	3.51	0.00	0.00	0.00	0.00	LBS/LB PAINT	ASSUME 420 GRAMS VOC/LITER
SOLVENT USE	1.8	GALLONS/YR/PLANE	7.36	0.00	0.00	0.00	0.00	LBS/LB SOLVENT	ASSUME 7.36 LB/GALLON, 100% VOLATILE
ABRASIVE BLASTING	67.3	POUNDS/YR/PLANE	0.00	0.00	0.00	0.00	0.01	LBS/LB ABRASIVE	NAS LEMOORE TITLE V ASSUMPTION
DIESEL ENGINES FOR GENERATORS, ETC.	80	HORSEPOWER	2.51	30.86	6.68	2.05	2.20	LBS/1000 HP-HRS	AP-42, SECT 3.3
HYDRAULIC TEST STAND ENGINES (JP-5)	5.5	HOURS/YR/PLANE	0.13	2.07	3.82	0.02	0.11	POUNDS/HOUR	MANUFACTURER DATA VIA NAS LEMOORE STAFF

TABLE D-18. MISCELLANEOUS EMISSION SOURCES, NAWS POINT MUGU ALTERNATIVE

SOURCE CATEGORY	USE INDEX AMOUNT	USE INDEX UNITS	ANNUAL EMISSIONS, TONS/YEAR ROG	NOx	CO	SOx	PM10	USE RATE ASSUMPTIONS
JP-5 AIRCRAFT FUEL TRANSFERS, 50 F	2.05	MILLION GAL/YEAR	0.028	0.000	0.000	0.000	0.000	1.025 MILLION GAL, 2 TRANSFERS, 50 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 60 F	6.15	MILLION GAL/YEAR	0.118	0.000	0.000	0.000	0.000	3.075 MILLION GAL, 2 TRANSFERS, 60 DEG F
NATURAL GAS USE, OFFICE/INDUSTRIAL	1.72	MILLION SCF/YEAR	0.003	0.070	0.052	0.001	0.010	10 BTU/HR/SF, 1000 BTU/SCF
NATURAL GAS USE, OFF-BASE HOUSING	199.27	MILLION SCF/DU/YEAR	0.723	9.365	3.985	0.060	1.114	24 BTU/HR/SF, 1400 SF/DU, 1000 BTU/SCF
PAINTING	54.4	GALLONS/YEAR	0.095	0.000	0.000	0.000	0.000	TITLE V TRACKING REPORT, NAS LEMOORE
SOLVENT USE	28.8	GALLONS/YEAR	0.106	0.000	0.000	0.000	0.000	TITLE V TRACKING REPORT, NAS LEMOORE
ABRASIVE BLASTING	1,077	POUNDS/YEAR	0.000	0.000	0.000	0.000	0.005	TITLE V TRACKING REPORT, NAS LEMOORE
PORTABLE/STATIONARY DIESEL ENGINES	8,000	HP-HOURS/YEAR	0.010	0.123	0.027	0.008	0.009	80 HP ENGINES, 100 HRS/YEAR
HYDRAULIC TEST STAND ENGINES	88	HOURS/YEAR	0.006	0.091	0.168	0.001	0.005	DATA PROVIDED BY NAS LEMOORE STAFF
ON-BASE PERMIT-EXEMPT SOURCES			0.019	0.284	0.247	0.009	0.024	
ON-BASE PERMIT SOURCES			0.348	0.000	0.000	0.000	0.005	
OFF-BASE AREA SOURCES			0.723	9.365	3.985	0.060	1.114	

TABLE D-19. MISCELLANEOUS EMISSION SOURCES, NAS LEMOORE ALTERNATIVE

SOURCE CATEGORY	USE INDEX AMOUNT	USE INDEX UNITS	ANNUAL EMISSIONS, TONS/YEAR ROG	NOx	CO	SOx	PM10	USE RATE ASSUMPTIONS
JP-5 AIRCRAFT FUEL TRANSFERS, 40 F	0.68	MILLION GAL/YEAR	0.007	0.000	0.000	0.000	0.000	0.342 MILLION GAL, 2 TRANSFERS, 40 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 50 F	2.73	MILLION GAL/YEAR	0.038	0.000	0.000	0.000	0.000	1.367 MILLION GAL, 2 TRANSFERS, 50 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 60 F	0.68	MILLION GAL/YEAR	0.013	0.000	0.000	0.000	0.000	0.342 MILLION GAL, 2 TRANSFERS, 60 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 70 F	2.73	MILLION GAL/YEAR	0.067	0.000	0.000	0.000	0.000	1.367 MILLION GAL, 2 TRANSFERS, 70 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 80 F	1.37	MILLION GAL/YEAR	0.045	0.000	0.000	0.000	0.000	0.683 MILLION GAL, 2 TRANSFERS, 80 DEG F
NATURAL GAS BOILER, HANGAR	35.87	MILLION SCF/YEAR	0.069	1.453	1.094	0.011	0.215	65% OF RATED CAPACITY
NATURAL GAS BOILER, BEQ	47.83	MILLION SCF/YEAR	0.092	1.937	1.459	0.014	0.287	65% OF RATED CAPACITY
NATURAL GAS USE, OFFICE/INDUSTRIAL	9.37	MILLION SCF/YEAR	0.018	0.380	0.286	0.003	0.056	10 BTU/HR/SF, 1000 BTU/SCF
NATURAL GAS USE, OFF-BASE HOUSING	199.27	MILLION SCF/DU/YEAR	0.723	9.365	3.985	0.060	1.114	24 BTU/HR/SF, 1400 SF/DU, 1000 BTU/SCF
PAINTING	54.4	GALLONS/YEAR	0.095	0.000	0.000	0.000	0.000	TITLE V TRACKING REPORT, NAS LEMOORE
SOLVENT USE	28.8	GALLONS/YEAR	0.106	0.000	0.000	0.000	0.000	TITLE V TRACKING REPORT, NAS LEMOORE
ABRASIVE BLASTING	1,077	POUNDS/YEAR	0.000	0.000	0.000	0.000	0.005	TITLE V TRACKING REPORT, NAS LEMOORE
PORTABLE/STATIONARY DIESEL ENGINES	8,000	HP-HOURS/YEAR	0.010	0.123	0.027	0.008	0.009	80 HP ENGINES, 100 HRS/YEAR
HYDRAULIC TEST STAND ENGINES	88	HOURS/YEAR	0.006	0.091	0.168	0.001	0.005	DATA PROVIDED BY NAS LEMOORE STAFF
ON-BASE PERMIT-EXEMPT SOURCES			0.034	0.594	0.481	0.012	0.070	
ON-BASE PERMIT SOURCES			0.530	3.390	2.553	0.025	0.508	
OFF-BASE AREA SOURCES			0.723	9.365	3.985	0.060	1.114	

TABLE D-20. MISCELLANEOUS EMISSION SOURCES, NAF EL CENTRO ALTERNATIVE

SOURCE CATEGORY	USE INDEX AMOUNT	USE INDEX UNITS	ANNUAL EMISSIONS, TONS/YEAR ROG	NOx	CO	SOx	PM10	USE RATE ASSUMPTIONS
JP-5 AIRCRAFT FUEL TRANSFERS, 60 F	3.42	MILLION GAL/YEAR	0.066	0.000	0.000	0.000	0.000	1.708 MILLION GAL, 2 TRANSFERS, 60 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 70 F	0.68	MILLION GAL/YEAR	0.017	0.000	0.000	0.000	0.000	0.342 MILLION GAL, 2 TRANSFERS, 70 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 80 F	1.37	MILLION GAL/YEAR	0.045	0.000	0.000	0.000	0.000	0.683 MILLION GAL, 2 TRANSFERS, 80 DEG F
JP-5 AIRCRAFT FUEL TRANSFERS, 90 F	2.73	MILLION GAL/YEAR	0.123	0.000	0.000	0.000	0.000	1.367 MILLION GAL, 2 TRANSFERS, 90 DEG F
NATURAL GAS BOILER, HANGAR	35.87	MILLION SCF/YEAR	0.069	1.453	1.094	0.011	0.215	65% OF RATED CAPACITY
NATURAL GAS BOILER, BEQ	47.83	MILLION SCF/YEAR	0.092	1.937	1.459	0.014	0.287	65% OF RATED CAPACITY
NATURAL GAS USE, OFFICE/INDUSTRIAL	14.38	MILLION SCF/YEAR	0.028	0.582	0.439	0.004	0.086	10 BTU/HR/SF, 1000 BTU/SCF
NATURAL GAS USE, OFF-BASE HOUSING	199.27	MILLION SCF/DU/YEAR	0.723	9.365	3.985	0.060	1.114	24 BTU/HR/SF, 1400 SF/DU, 1000 BTU/SCF
PAINTING	54.4	GALLONS/YEAR	0.095	0.000	0.000	0.000	0.000	TITLE V TRACKING REPORT, NAS LEMOORE
SOLVENT USE	28.8	GALLONS/YEAR	0.106	0.000	0.000	0.000	0.000	TITLE V TRACKING REPORT, NAS LEMOORE
ABRASIVE BLASTING	1,077	POUNDS/YEAR	0.000	0.000	0.000	0.000	0.005	TITLE V TRACKING REPORT, NAS LEMOORE
PORTABLE/STATIONARY DIESEL ENGINES	8,000	HP-HOURS/YEAR	0.010	0.123	0.027	0.008	0.009	80 HP ENGINES, 100 HRS/YEAR
HYDRAULIC TEST STAND ENGINES	88	HOURS/YEAR	0.006	0.091	0.168	0.001	0.005	DATA PROVIDED BY NAS LEMOORE STAFF
ON-BASE PERMIT-EXEMPT SOURCES			0.043	0.797	0.633	0.013	0.100	
ON-BASE PERMIT SOURCES			0.611	3.390	2.553	0.025	0.508	
OFF-BASE AREA SOURCES			0.723	9.365	3.985	0.060	1.114	

This page intentionally left blank.

Personal Vehicles, On-base Housing

TABLE D-21. GENERALIZED VEHICLE TRAVEL TIME PATTERNS AND OPERATING MODES FOR ON-BASE HOUSING

TRIP TYPE	PORTION OF TOTAL TRIPS	DISTRIBUTION OF TRAVEL BY TRIP DURATION INTERVALS: UNDER 8 MINUTES	8 - 10 MINUTES	10 - 15 MINUTES	15 - 20 MINUTES	20 - 25 MINUTES	25 - 30 MINUTES	30 - 35 MINUTES	35 - 40 MINUTES	40 - 45 MINUTES	45 - 50 MINUTES	OVER 50 MINUTES
H-W	35.00%	45.00%	30.00%	20.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
H-S	40.00%	50.00%	20.00%	15.00%	5.00%	3.00%	2.00%	1.00%	1.00%	1.00%	1.00%	1.00%
H-O	25.00%	20.00%	15.00%	25.00%	15.00%	10.00%	7.00%	3.00%	2.00%	1.00%	1.00%	1.00%
SUM/MEAN	100.00%	40.75%	22.25%	19.25%	5.75%	3.70%	2.55%	1.15%	0.90%	0.65%	0.65%	0.65%

CUMULATIVE TRIP OPERATING MODES (FOR TOTAL EMISSIONS ANALYSES):

TRIP TYPE	MEAN TRAVEL TIME (MINUTES)	MEAN COLD START MODE	MEAN HOT START MODE	MEAN HOT STABLE MODE	NONCAT COLD START MODE	NONCAT HOT START MODE	CATALYST COLD START MODE	CATALYST HOT START MODE
H-W	7.68	84.65%	7.22%	8.13%	73.54%	18.34%	85.10%	6.77%
H-S	10.78	43.90%	40.30%	15.81%	28.30%	55.90%	44.53%	39.66%
H-O	15.65	44.46%	21.53%	34.01%	28.63%	37.36%	45.11%	20.89%
MEANS	10.91	58.30%	24.03%	17.67%	44.21%	38.12%	58.87%	23.46%

TABLE D-22. EMFAC7F INPUT ASSUMPTIONS FOR NAWS PT MUGU HOUSING TRIPS

SUMMARY OF INPUT ASSUMPTIONS:

CALENDAR YEAR: 1999 I&M PROGRAM: YES

VEHICLE MIX ASSUMPTIONS:

LDA	LDT	MDT	HDG	HDD	BUS	MCY
70.94%	25.50%	2.52%	0.00%	0.00%	0.00%	1.04%

AIR TEMPERATURE FOR EXHAUST RATES, SUMMER: 60 WINTER: 50

EVAPORATIVE EMISSIONS TEMPERATURE PATTERNS:

	MINIMUM	8 AM	9 AM	11 AM	1 PM	MAXIMUM
SUMMER	55	57	59	65	68	70
WINTER	45	45	47	54	60	62

OPERATING MODE ASSUMPTIONS BY TRIP TYPE:

	COLD START	HOT START	HOT STABLE	3-CATEGORY MIX BASIS: WORK	SHOP	OTHER
H-W	84.65%	7.22%	8.13%	100.0%	0.0%	0.0%
H-S	43.90%	40.30%	15.80%	0.0%	100.0%	0.0%
H-O	44.46%	21.53%	34.01%	0.0%	0.0%	100.0%
O-W	39.94%	24.70%	35.36%	0.0%	0.0%	0.0%
O-O	22.55%	57.72%	19.73%	0.0%	0.0%	0.0%
WORK	84.65%	7.22%	8.13%			
SHOP	43.90%	40.30%	15.80%			
OTHER	44.46%	21.53%	34.01%			

NOTES: LDA = light duty autos
LDT = light duty trucks
MDT = medium duty trucks
HDG = heavy duty gasoline-fueled vehicles
HDD = heavy duty diesel-fueled vehicles
BUS = diesel-fueled urban buses
MCY = motorcycles
H-W = home-work trips
H-S = home-shopping trips
H-O = home-other trips
O-W = other-work trips
O-O = other-other trips
WORK = combined home-work and other-work trips
SHOP = home-shopping trips
OTHER = combined home-other and other-other trips

TABLE D-23. 1999 EMISSION RATES FOR NAWS PT MUGU HOUSING TRIPS

POL-LUTANT	TRIP PURPOSE	GRAM/MILE RATES BY SPEED IN MPH 15	25	35	45	55
ROG	WORK	2.18	1.87	1.76	1.68	1.68
	SHOP	1.57	1.26	1.15	1.07	1.08
	OTHER	1.54	1.23	1.12	1.04	1.05
NOx	WORK	1.41	1.22	1.22	1.35	1.67
	SHOP	1.26	1.07	1.06	1.19	1.51
	OTHER	1.18	0.99	0.98	1.12	1.43
CO-S	WORK	22.56	20.45	19.50	19.06	19.58
	SHOP	15.64	13.53	12.58	12.14	12.67
	OTHER	15.22	13.11	12.16	11.72	12.24
CO-W	WORK	27.68	25.30	24.23	23.73	24.28
	SHOP	17.96	15.58	14.51	14.01	14.56
	OTHER	17.93	15.55	14.47	13.97	14.53
PMEX	WORK	0.01	0.01	0.01	0.01	0.01
	SHOP	0.01	0.01	0.01	0.01	0.01
	OTHER	0.01	0.01	0.01	0.01	0.01
PMTW	WORK	0.20	0.20	0.20	0.20	0.20
	SHOP	0.20	0.20	0.20	0.20	0.20
	OTHER	0.20	0.20	0.20	0.20	0.20
		soak	drnl/rstl			
	WORK	0.50	3.54			
	SHOP	0.50	3.54			
	OTHER	0.50	3.54			

TABLE D-24. EMFAC7F INPUT ASSUMPTIONS FOR NAS LEMOORE HOUSING TRIPS

SUMMARY OF INPUT ASSUMPTIONS:

CALENDAR YEAR: 1999 I&M PROGRAM: YES

VEHICLE MIX ASSUMPTIONS:

LDA	LDT	MDT	HDG	HDD	BUS	MCY
70.94%	25.50%	2.52%	0.00%	0.00%	0.00%	1.04%

AIR TEMPERATURE FOR EXHAUST RATES, SUMMER: 85 WINTER: 40

EVAPORATIVE EMISSIONS TEMPERATURE PATTERNS:

	MINIMUM	8 AM	9 AM	11 AM	1 PM	MAXIMUM
SUMMER	60	64	70	86	94	100
WINTER	35	35	37	43	49	50

OPERATING MODE ASSUMPTIONS BY TRIP TYPE:

	COLD START	HOT START	HOT STABLE	3-CATEGORY MIX BASIS: WORK	SHOP	OTHER
H-W	84.65%	7.22%	8.13%	100.0%	0.0%	0.0%
H-S	43.90%	40.30%	15.80%	0.0%	100.0%	0.0%
H-O	44.46%	21.53%	34.01%	0.0%	0.0%	100.0%
O-W	39.94%	24.70%	35.36%	0.0%	0.0%	0.0%
O-O	22.55%	57.72%	19.73%	0.0%	0.0%	0.0%
WORK	84.65%	7.22%	8.13%			
SHOP	43.90%	40.30%	15.80%			
OTHER	44.46%	21.53%	34.01%			

NOTES: LDA = light duty autos
LDT = light duty trucks
MDT = medium duty trucks
HDG = heavy duty gasoline-fueled vehicles
HDD = heavy duty diesel-fueled vehicles
BUS = diesel-fueled urban buses
MCY = motorcycles
H-W = home-work trips
H-S = home-shopping trips
H-O = home-other trips
O-W = other-work trips
O-O = other-other trips
WORK = combined home-work and other-work trips
SHOP = home-shopping trips
OTHER = combined home-other and other-other trips

TABLE D-25. 1999 EMISSION RATES FOR NAS LEMOORE HOUSING TRIPS

POL-LUTANT	TRIP PURPOSE	GRAM/MILE RATES BY SPEED IN MPH 15	25	35	45	55
ROG	WORK	1.88	1.31	1.15	1.06	1.09
	SHOP	1.59	1.02	0.85	0.76	0.79
	OTHER	1.56	0.99	0.82	0.73	0.76
NOx	WORK	1.25	1.08	1.07	1.19	1.48
	SHOP	1.10	0.93	0.92	1.04	1.33
	OTHER	1.04	0.87	0.86	0.98	1.26
CO-S	WORK	14.84	12.65	11.67	11.21	11.74
	SHOP	11.77	9.58	8.59	8.14	8.67
	OTHER	11.28	9.09	8.11	7.65	8.18
CO-W	WORK	32.88	30.27	29.09	28.54	29.16
	SHOP	20.98	18.37	17.19	16.63	17.26
	OTHER	20.98	18.37	17.19	16.64	17.26
PMEX	WORK	0.01	0.01	0.01	0.01	0.01
	SHOP	0.01	0.01	0.01	0.01	0.01
	OTHER	0.01	0.01	0.01	0.01	0.01
PMTW	WORK	0.20	0.20	0.20	0.20	0.20
	SHOP	0.20	0.20	0.20	0.20	0.20
	OTHER	0.20	0.20	0.20	0.20	0.20
		soak	drnl/rstl			
	WORK	0.50	6.43			
	SHOP	0.50	6.43			
	OTHER	0.50	6.43			

TABLE D-26. EMFAC7F INPUT ASSUMPTIONS FOR NAF EL CENTRO HOUSING TRIPS

SUMMARY OF INPUT ASSUMPTIONS:

CALENDAR YEAR: 1999 I&M PROGRAM: YES

VEHICLE MIX ASSUMPTIONS:

LDA	LDT	MDT	HDG	HDD	BUS	MCY
70.94%	25.50%	2.52%	0.00%	0.00%	0.00%	1.04%

AIR TEMPERATURE FOR EXHAUST RATES, SUMMER: 90 WINTER: 60

EVAPORATIVE EMISSIONS TEMPERATURE PATTERNS:

	MINIMUM	8 AM	9 AM	11 AM	1 PM	MAXIMUM
SUMMER	78	81	85	96	101	105
WINTER	45	45	48	59	68	70

OPERATING MODE ASSUMPTIONS BY TRIP TYPE:

	COLD START	HOT START	HOT STABLE	3-CATEGORY MIX BASIS: WORK	SHOP	OTHER
H-W	84.65%	7.22%	8.13%	100.0%	0.0%	0.0%
H-S	43.90%	40.30%	15.80%	0.0%	100.0%	0.0%
H-O	44.46%	21.53%	34.01%	0.0%	0.0%	100.0%
O-W	39.94%	24.70%	35.36%	0.0%	0.0%	0.0%
O-O	22.55%	57.72%	19.73%	0.0%	0.0%	0.0%
WORK	84.65%	7.22%	8.13%			
SHOP	43.90%	40.30%	15.80%			
OTHER	44.46%	21.53%	34.01%			

NOTES: LDA = light duty autos
LDT = light duty trucks
MDT = medium duty trucks
HDG = heavy duty gasoline-fueled vehicles
HDD = heavy duty diesel-fueled vehicles
BUS = diesel-fueled urban buses
MCY = motorcycles
H-W = home-work trips
H-S = home-shopping trips
H-O = home-other trips
O-W = other-work trips
O-O = other-other trips
WORK = combined home-work and other-work trips
SHOP = home-shopping trips
OTHER = combined home-other and other-other trips

TABLE D-27. 1999 EMISSION RATES FOR NAF EL CENTRO HOUSING TRIPS

POL-LUTANT	TRIP PURPOSE	GRAM/MILE RATES BY SPEED IN MPH 15	25	35	45	55
ROG	WORK	1.99	1.33	1.14	1.05	1.08
	SHOP	1.72	1.05	0.87	0.77	0.81
	OTHER	1.68	1.02	0.84	0.74	0.78
NOx	WORK	1.25	1.08	1.07	1.19	1.48
	SHOP	1.10	0.93	0.92	1.05	1.34
	OTHER	1.04	0.87	0.86	0.98	1.27
CO-S	WORK	15.16	12.83	11.79	11.30	11.87
	SHOP	12.26	9.93	8.88	8.40	8.96
	OTHER	11.70	9.37	8.33	7.84	8.41
CO-W	WORK	22.46	20.25	19.25	18.79	19.30
	SHOP	15.01	12.80	11.81	11.34	11.85
	OTHER	14.95	12.74	11.74	11.28	11.79
PMEX	WORK	0.01	0.01	0.01	0.01	0.01
	SHOP	0.01	0.01	0.01	0.01	0.01
	OTHER	0.01	0.01	0.01	0.01	0.01
PMTW	WORK	0.20	0.20	0.20	0.20	0.20
	SHOP	0.20	0.20	0.20	0.20	0.20
	OTHER	0.20	0.20	0.20	0.20	0.20
		soak	drnl/rstl			
	WORK	0.50	8.11			
	SHOP	0.50	8.11			
	OTHER	0.50	8.11			

This page intentionally left blank.

Personal Vehicles, Off-base Housing

TABLE D-28. VEHICLE TRAVEL TIME PATTERNS AND OPERATING MODES, OFF-BASE HOUSING AT NAWS POINT MUGU

TRIP TYPE	PORTION OF TOTAL TRIPS	DISTRIBUTION OF TRAVEL BY TRIP DURATION INTERVALS										
		UNDER 8 MINUTES	8 - 10 MINUTES	10 - 15 MINUTES	15 - 20 MINUTES	20 - 25 MINUTES	25 - 30 MINUTES	30 - 35 MINUTES	35 - 40 MINUTES	40 - 45 MINUTES	45 - 50 MINUTES	OVER 50 MINUTES
H-W	35.00%	15.00%	10.00%	25.00%	15.00%	12.00%	10.00%	6.00%	4.00%	1.00%	1.00%	1.00%
H-S	40.00%	45.00%	20.00%	13.00%	10.00%	5.00%	2.00%	1.00%	1.00%	1.00%	1.00%	1.00%
H-O	25.00%	20.00%	15.00%	25.00%	15.00%	10.00%	7.00%	3.00%	2.00%	1.00%	1.00%	1.00%
SUM/MEAN	100.00%	28.25%	15.25%	20.20%	13.00%	8.70%	6.05%	3.25%	2.30%	1.00%	1.00%	1.00%

CUMULATIVE TRIP OPERATING MODES (FOR TOTAL EMISSIONS ANALYSES):

TRIP TYPE	MEAN TRAVEL TIME (MINUTES)	MEAN COLD START MODE	MEAN HOT START MODE	MEAN HOT STABLE MODE	NONCAT COLD START MODE	NONCAT HOT START MODE	CATALYST COLD START MODE	CATALYST HOT START MODE
H-W	17.93	54.52%	4.65%	40.83%	47.36%	11.81%	54.81%	4.36%
H-S	11.58	42.23%	38.77%	19.00%	27.23%	53.78%	42.84%	38.16%
H-O	15.65	44.46%	21.53%	34.01%	28.63%	37.36%	45.11%	20.89%
MEANS	14.82	47.09%	22.52%	30.39%	34.62%	34.99%	47.60%	22.01%

TABLE D-29. VEHICLE TRAVEL TIME PATTERNS AND OPERATING MODES, OFF-BASE HOUSING AT NAS LEMOORE

TRIP TYPE	PORTION OF TOTAL TRIPS	DISTRIBUTION OF TRAVEL BY TRIP DURATION INTERVALS										
		UNDER 8 MINUTES	8 - 10 MINUTES	10 - 15 MINUTES	15 - 20 MINUTES	20 - 25 MINUTES	25 - 30 MINUTES	30 - 35 MINUTES	35 - 40 MINUTES	40 - 45 MINUTES	45 - 50 MINUTES	OVER 50 MINUTES
H-W	35.00%	15.00%	25.00%	17.00%	12.00%	15.00%	10.00%	1.00%	1.00%	2.00%	1.00%	1.00%
H-S	40.00%	45.00%	20.00%	13.00%	5.00%	10.00%	2.00%	1.00%	1.00%	1.00%	1.00%	1.00%
H-O	25.00%	20.00%	18.00%	25.00%	10.00%	15.00%	5.00%	1.00%	1.00%	3.00%	1.00%	1.00%
SUM/MEAN	100.00%	28.25%	21.25%	17.40%	8.70%	13.00%	5.55%	1.00%	1.00%	1.85%	1.00%	1.00%

CUMULATIVE TRIP OPERATING MODES (FOR TOTAL EMISSIONS ANALYSES):

TRIP TYPE	MEAN TRAVEL TIME (MINUTES)	MEAN COLD START MODE	MEAN HOT START MODE	MEAN HOT STABLE MODE	NONCAT COLD START MODE	NONCAT HOT START MODE	CATALYST COLD START MODE	CATALYST HOT START MODE
H-W	16.10	60.64%	5.17%	34.19%	52.68%	13.14%	60.96%	4.85%
H-S	11.83	41.95%	38.51%	19.53%	27.04%	53.42%	42.56%	37.91%
H-O	15.45	45.36%	21.96%	32.68%	29.20%	38.12%	46.02%	21.31%
MEANS	14.23	49.34%	22.71%	27.95%	36.56%	35.50%	49.86%	22.19%

TABLE D-30. VEHICLE TRAVEL TIME PATTERNS AND OPERATING MODES, OFF-BASE HOUSING AT NAF EL CENTRO

TRIP TYPE	PORTION OF TOTAL TRIPS	DISTRIBUTION OF TRAVEL BY TRIP DURATION INTERVALS: UNDER 8 MINUTES	8 - 10 MINUTES	10 - 15 MINUTES	15 - 20 MINUTES	20 - 25 MINUTES	25 - 30 MINUTES	30 - 35 MINUTES	35 - 40 MINUTES	40 - 45 MINUTES	45 - 50 MINUTES	OVER 50 MINUTES
H-W	35.00%	20.00%	25.00%	20.00%	10.00%	10.00%	2.00%	2.00%	4.00%	3.00%	2.00%	2.00%
H-S	40.00%	40.00%	20.00%	15.00%	10.00%	5.00%	2.00%	1.00%	2.00%	2.00%	2.00%	1.00%
H-O	25.00%	20.00%	15.00%	25.00%	10.00%	10.00%	3.00%	5.00%	5.00%	3.00%	2.00%	2.00%
SUM/MEAN	100.00%	28.00%	20.50%	19.25%	10.00%	8.00%	2.25%	2.35%	3.45%	2.60%	2.00%	1.60%

CUMULATIVE TRIP OPERATING MODES (FOR TOTAL EMISSIONS ANALYSES):

TRIP TYPE	MEAN TRAVEL TIME (MINUTES)	MEAN COLD START MODE	MEAN HOT START MODE	MEAN HOT STABLE MODE	NONCAT COLD START MODE	NONCAT HOT START MODE	CATALYST COLD START MODE	CATALYST HOT START MODE
H-W	16.08	63.56%	5.42%	31.01%	55.22%	13.77%	63.90%	5.08%
H-S	12.83	40.65%	37.31%	22.04%	26.20%	51.76%	41.23%	36.73%
H-O	17.43	43.29%	20.96%	35.75%	27.87%	36.38%	43.91%	20.33%
MEANS	15.11	49.33%	22.06%	28.61%	36.77%	34.62%	49.84%	21.55%

TABLE D-31. EMFAC7F INPUT ASSUMPTIONS, NAWS PT MUGU OFF-BASE HOUSING

SUMMARY OF INPUT ASSUMPTIONS:

CALENDAR YEAR: 1999 I&M PROGRAM: YES

VEHICLE MIX ASSUMPTIONS:

LDA	LDT	MDT	HDG	HDD	BUS	MCY
70.94%	25.50%	2.52%	0.00%	0.00%	0.00%	1.04%

AIR TEMPERATURE FOR EXHAUST RATES, SUMMER: 60 WINTER: 50

EVAPORATIVE EMISSIONS TEMPERATURE PATTERNS:

	MINIMUM	8 AM	9 AM	11 AM	1 PM	MAXIMUM
SUMMER	55	57	59	65	68	70
WINTER	45	45	47	54	60	62

OPERATING MODE ASSUMPTIONS BY TRIP TYPE:

	COLD START	HOT START	HOT STABLE	3-CATEGORY MIX BASIS: WORK	SHOP	OTHER
H-W	54.52%	4.65%	40.83%	100.0%	0.0%	0.0%
H-S	42.23%	38.77%	19.00%	0.0%	100.0%	0.0%
H-O	44.46%	21.53%	34.01%	0.0%	0.0%	100.0%
O-W	39.94%	24.70%	35.36%	0.0%	0.0%	0.0%
O-O	22.55%	57.72%	19.73%	0.0%	0.0%	0.0%
WORK	54.52%	4.65%	40.83%			
SHOP	42.23%	38.77%	19.00%			
OTHER	44.46%	21.53%	34.01%			

NOTES: LDA = light duty autos
LDT = light duty trucks
MDT = medium duty trucks
HDG = heavy duty gasoline-fueled vehicles
HDD = heavy duty diesel-fueled vehicles
BUS = diesel-fueled urban buses
MCY = motorcycles
H-W = home-work trips
H-S = home-shopping trips
H-O = home-other trips
O-W = other-work trips
O-O = other-other trips
WORK = combined home-work and other-work trips
SHOP = home-shopping trips
OTHER = combined home-other and other-other trips

TABLE D-32. 1999 EMISSION RATES, NAWS PT MUGU OFF-BASE HOUSING

POL-LUTANT	TRIP PURPOSE	GRAM/MILE RATES BY SPEED IN MPH 15	25	35	45	55
ROG	WORK	1.67	1.36	1.25	1.17	1.18
	SHOP	1.54	1.23	1.12	1.04	1.05
	OTHER	1.54	1.23	1.12	1.04	1.05
NOx	WORK	1.18	0.99	0.98	1.12	1.43
	SHOP	1.24	1.05	1.04	1.18	1.49
	OTHER	1.18	0.99	0.98	1.12	1.43
CO-S	WORK	16.68	14.57	13.62	13.18	13.71
	SHOP	15.28	13.17	12.22	11.78	12.30
	OTHER	15.22	13.11	12.16	11.72	12.24
CO-W	WORK	20.25	17.87	16.80	16.30	16.85
	SHOP	17.54	15.16	14.08	13.58	14.14
	OTHER	17.93	15.55	14.47	13.97	14.53
PMEX	WORK	0.01	0.01	0.01	0.01	0.01
	SHOP	0.01	0.01	0.01	0.01	0.01
	OTHER	0.01	0.01	0.01	0.01	0.01
PMTW	WORK	0.20	0.20	0.20	0.20	0.20
	SHOP	0.20	0.20	0.20	0.20	0.20
	OTHER	0.20	0.20	0.20	0.20	0.20
		soak	drnl/rstl			
	WORK	0.50	3.54			
	SHOP	0.50	3.54			
	OTHER	0.50	3.54			

TABLE D-33. EMFAC7F INPUT ASSUMPTIONS, NAS LEMOORE OFF-BASE HOUSING

SUMMARY OF INPUT ASSUMPTIONS:

CALENDAR YEAR: 1999 I&M PROGRAM: YES

VEHICLE MIX ASSUMPTIONS:

LDA	LDT	MDT	HDG	HDD	BUS	MCY
70.94%	25.50%	2.52%	0.00%	0.00%	0.00%	1.04%

AIR TEMPERATURE FOR EXHAUST RATES, SUMMER: 85 WINTER: 40

EVAPORATIVE EMISSIONS TEMPERATURE PATTERNS:

	MINIMUM	8 AM	9 AM	11 AM	1 PM	MAXIMUM
SUMMER	60	64	70	86	94	100
WINTER	35	35	37	43	49	50

OPERATING MODE ASSUMPTIONS BY TRIP TYPE:

	COLD START	HOT START	HOT STABLE	3-CATEGORY MIX BASIS: WORK	SHOP	OTHER
H-W	60.64%	5.17%	34.19%	100.0%	0.0%	0.0%
H-S	41.95%	38.51%	19.54%	0.0%	100.0%	0.0%
H-O	45.36%	21.96%	32.68%	0.0%	0.0%	100.0%
O-W	39.94%	24.70%	35.36%	0.0%	0.0%	0.0%
O-O	22.55%	57.72%	19.73%	0.0%	0.0%	0.0%
WORK	60.64%	5.17%	34.19%			
SHOP	41.95%	38.51%	19.54%			
OTHER	45.36%	21.96%	32.68%			

NOTES: LDA = light duty autos
LDT = light duty trucks
MDT = medium duty trucks
HDG = heavy duty gasoline-fueled vehicles
HDD = heavy duty diesel-fueled vehicles
BUS = diesel-fueled urban buses
MCY = motorcycles
H-W = home-work trips
H-S = home-shopping trips
H-O = home-other trips
O-W = other-work trips
O-O = other-other trips
WORK = combined home-work and other-work trips
SHOP = home-shopping trips
OTHER = combined home-other and other-other trips

TABLE D-34. 1999 EMISSION RATES, NAS LEMOORE OFF-BASE HOUSING

POL-LUTANT	TRIP PURPOSE	GRAM/MILE RATES BY SPEED IN MPH 15	25	35	45	55
ROG	WORK	1.67	1.10	0.93	0.84	0.87
	SHOP	1.57	1.00	0.83	0.74	0.77
	OTHER	1.57	1.00	0.83	0.74	0.77
NOx	WORK	1.08	0.91	0.91	1.03	1.31
	SHOP	1.08	0.91	0.90	1.03	1.31
	OTHER	1.04	0.87	0.87	0.99	1.27
CO-S	WORK	12.41	10.22	9.23	8.78	9.31
	SHOP	11.52	9.33	8.35	7.89	8.43
	OTHER	11.38	9.19	8.21	7.75	8.29
CO-W	WORK	25.68	23.06	21.88	21.33	21.95
	SHOP	20.38	17.77	16.59	16.04	16.66
	OTHER	21.25	18.64	17.46	16.91	17.53
PMEX	WORK	0.01	0.01	0.01	0.01	0.01
	SHOP	0.01	0.01	0.01	0.01	0.01
	OTHER	0.01	0.01	0.01	0.01	0.01
PMTW	WORK	0.20	0.20	0.20	0.20	0.20
	SHOP	0.20	0.20	0.20	0.20	0.20
	OTHER	0.20	0.20	0.20	0.20	0.20
		soak	drnl/rstl			
	WORK	0.50	6.43			
	SHOP	0.50	6.43			
	OTHER	0.50	6.43			

TABLE D-35. EMFAC7F INPUT ASSUMPTIONS, NAF EL CENTRO OFF-BASE HOUSING

SUMMARY OF INPUT ASSUMPTIONS:

CALENDAR YEAR: 1999 I&M PROGRAM: YES

VEHICLE MIX ASSUMPTIONS:

LDA	LDT	MDT	HDG	HDD	BUS	MCY
70.94%	25.50%	2.52%	0.00%	0.00%	0.00%	1.04%

AIR TEMPERATURE FOR EXHAUST RATES, SUMMER: 90 WINTER: 60

EVAPORATIVE EMISSIONS TEMPERATURE PATTERNS:

	MINIMUM	8 AM	9 AM	11 AM	1 PM	MAXIMUM
SUMMER	78	81	85	96	101	105
WINTER	45	45	48	59	68	70

OPERATING MODE ASSUMPTIONS BY TRIP TYPE:

	COLD START	HOT START	HOT STABLE	3-CATEGORY MIX BASIS: WORK	SHOP	OTHER
H-W	63.56%	5.42%	31.02%	100.0%	0.0%	0.0%
H-S	40.65%	37.31%	22.04%	0.0%	100.0%	0.0%
H-O	43.29%	20.96%	35.75%	0.0%	0.0%	100.0%
O-W	39.94%	24.70%	35.36%	0.0%	0.0%	0.0%
O-O	22.55%	57.72%	19.73%	0.0%	0.0%	0.0%
WORK	63.56%	5.42%	31.02%			
SHOP	40.65%	37.31%	22.04%			
OTHER	43.29%	20.96%	35.75%			

NOTES: LDA = light duty autos
LDT = light duty trucks
MDT = medium duty trucks
HDG = heavy duty gasoline-fueled vehicles
HDD = heavy duty diesel-fueled vehicles
BUS = diesel-fueled urban buses
MCY = motorcycles
H-W = home-work trips
H-S = home-shopping trips
H-O = home-other trips
O-W = other-work trips
O-O = other-other trips
WORK = combined home-work and other-work trips
SHOP = home-shopping trips
OTHER = combined home-other and other-other trips

TABLE D-36. 1999 EMISSION RATES, NAF EL CENTRO OFF-BASE HOUSING

POL-LUTANT	TRIP PURPOSE	GRAM/MILE RATES BY SPEED IN MPH 15	25	35	45	55
ROG	WORK	1.81	1.15	0.96	0.87	0.90
	SHOP	1.68	1.02	0.84	0.74	0.78
	OTHER	1.67	1.01	0.83	0.73	0.77
NOx	WORK	1.11	0.93	0.93	1.05	1.34
	SHOP	1.07	0.90	0.89	1.02	1.30
	OTHER	1.03	0.86	0.85	0.97	1.26
CO-S	WORK	13.04	10.72	9.67	9.18	9.75
	SHOP	11.84	9.51	8.47	7.98	8.55
	OTHER	11.57	9.24	8.20	7.71	8.28
CO-W	WORK	18.43	16.23	15.23	14.77	15.28
	SHOP	14.37	12.16	11.16	10.70	11.21
	OTHER	14.72	12.51	11.52	11.05	11.56
PMEX	WORK	0.01	0.01	0.01	0.01	0.01
	SHOP	0.01	0.01	0.01	0.01	0.01
	OTHER	0.01	0.01	0.01	0.01	0.01
PMTW	WORK	0.20	0.20	0.20	0.20	0.20
	SHOP	0.20	0.20	0.20	0.20	0.20
	OTHER	0.20	0.20	0.20	0.20	0.20
		soak	drnl/rstl			
	WORK	0.50	8.11			
	SHOP	0.50	8.11			
	OTHER	0.50	8.11			

This page intentionally left blank.

E-2 Personnel, Vehicle Emissions Estimate

TABLE D-37. TRIP PURPOSE DISSAGGREGATION AND TRAVEL SPEED DISTRIBUTIONS: NAWS POINT MUGU ALTERNATIVE

Land Use	Trip Estimate Basis	Trip Purpose	Percent of Net Trips	Net Trip Rates	TCM Program Effect	Adjusted Net Trip Rate	Adjusted Net Trips	Overall TCM Effectiveness	Mean Trip Duration (Minutes)	Percent of Travel Time by Speed (mph)				
										15	25	35	45	55
On-Base Housing	311 Personnel	WORK	35.0%	1.4	0%	1.4	435		7.68	30.0%	60.0%	10.0%	0.0%	0.0%
		SHOPPING	40.0%	1.6	0%	1.6	498		10.78	10.0%	35.0%	35.0%	10.0%	10.0%
		OTHER	25.0%	1.0	0%	1.0	311		15.65	10.0%	25.0%	35.0%	15.0%	15.0%
Off-Base Housing	685 Personnel	WORK	35.0%	2.3	0%	2.3	1,559		17.93	5.0%	25.0%	30.0%	20.0%	20.0%
		SHOPPING	40.0%	2.6	0%	2.6	1,781		11.58	10.0%	35.0%	35.0%	10.0%	10.0%
		OTHER	25.0%	1.6	0%	1.6	1,113		15.65	10.0%	25.0%	35.0%	15.0%	15.0%
TOTALS							5,697	0.0%						

Note: TCM = transportation control measures

TABLE D-38. VEHICLE EMISSIONS FOR E-2 PERSONNEL: NAWS POINT MUGU ALTERNATIVE

LAND USE	TRIP ESTIMATE BASIS	TRIP PURPOSE	AVERAGE DAILY TRIPS	MEAN TRIP DURATION (MINUTES)	AVERAGE DISTANCE (MILES)	DAILY VMT BY TRIP PURPOSE	AVERAGE SPEED (MPH)	ROG Emissions (lbs/day)	NOx Emissions (lbs/day)	PM10 Emissions (lbs/day)	Summer CO Emissions (lbs/day)	Winter CO Emissions (lbs/day)	SOx Emissions (lbs/day)
On-Base Housing	311 Personnel	WORK	435	7.7	2.94	1,281	23.0	6.7	3.6	8.8	58.5	72.3	0.1
		SHOPPING	498	10.8	5.84	2,908	32.5	9.0	7.5	19.9	82.9	95.5	0.2
		OTHER	311	15.7	9.13	2,839	35.0	7.9	7.0	19.5	77.6	92.2	0.2
Off-Base Housing	685 Personnel	WORK	1,559	17.9	11.21	17,471	37.5	50.9	44.3	119.8	530.0	652.5	1.2
		SHOPPING	1,781	11.6	6.27	11,171	32.5	32.1	28.2	76.6	309.5	356.4	0.7
		OTHER	1,113	15.7	9.13	10,161	35.0	27.6	25.1	69.7	277.7	330.0	0.7
TOTALS:		WORK	1,994	15.7	9.40	18,751	35.9	57.6	47.9	128.6	588.5	724.8	1.2
		SHOPPING	2,279	11.4	6.18	14,079	32.5	41.1	35.7	96.6	392.5	451.9	0.9
		OTHER	1,424	15.7	9.13	13,000	35.0	35.5	32.2	89.2	355.3	422.2	0.9
			5,697	14.0	8.04	45,830	34.5	134.1	115.7	314.3	1336.3	1598.9	3.0
	Base-Related Travel		1,994			18,751		57.6	47.9	128.6	588.5	724.8	1.2
	Other Household Travel		3,703			27,079		76.5	67.9	185.7	747.7	874.1	1.8

Notes: VMT = vehicle miles traveled
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter
VMT = vehicle miles traveled

TABLE D-39. TRIP PURPOSE DISSAGGREGATION AND TRAVEL SPEED DISTRIBUTIONS: NAS LEMOORE ALTERNATIVE

Land Use	Trip Estimate Basis	Trip Purpose	Percent of Net Trips	Net Trip Rates	TCM Program Effect	Adjusted Net Trip Rate	Adjusted Net Trips	Overall TCM Effectiveness	Mean Trip Duration (Minutes)	Percent of Travel Time by Speed (mph)				
										15	25	35	45	55
On-Base Housing	311 Personnel	WORK	35.0%	1.4	0%	1.4	435		7.68	15.0%	25.0%	35.0%	20.0%	5.0%
		SHOPPING	40.0%	1.6	0%	1.6	498		10.78	10.0%	35.0%	35.0%	10.0%	10.0%
		OTHER	25.0%	1.0	0%	1.0	311		15.65	10.0%	25.0%	35.0%	15.0%	15.0%
Off-Base Housing	677 Personnel	WORK	35.0%	2.3	0%	2.3	1,540		16.10	5.0%	25.0%	30.0%	20.0%	20.0%
		SHOPPING	40.0%	2.6	0%	2.6	1,760		11.83	10.0%	35.0%	35.0%	10.0%	10.0%
		OTHER	25.0%	1.6	0%	1.6	1,100		15.45	10.0%	25.0%	35.0%	15.0%	15.0%
TOTALS							5,644	0.0%						

Note: TCM = transportation control measures

TABLE D-40. VEHICLE EMISSIONS FOR E-2 PERSONNEL: NAS LEMOORE ALTERNATIVE

LAND USE	TRIP ESTIMATE BASIS	TRIP PURPOSE	AVERAGE DAILY TRIPS	MEAN TRIP DURATION (MINUTES)	AVERAGE DISTANCE (MILES)	DAILY VMT BY TRIP PURPOSE	AVERAGE TRAVEL SPEED (MPH)	ROG Emissions (lbs/day)	NOx Emissions (lbs/day)	PM10 Emissions (lbs/day)	Summer CO Emissions (lbs/day)	Winter CO Emissions (lbs/day)	SOx Emissions (lbs/day)
On-Base Housing	311 Personnel	WORK	435	7.7	4.16	1,810	32.5	6.7	4.6	12.4	47.7	117.4	0.1
		SHOPPING	498	10.8	5.84	2,908	32.5	8.0	6.5	19.9	57.4	112.9	0.2
		OTHER	311	15.7	9.13	2,839	35.0	6.6	6.2	19.5	52.3	109.4	0.2
Off-Base Housing	677 Personnel	WORK	1,540	16.1	10.06	15,496	37.5	36.3	36.2	106.3	320.3	753.1	1.0
		SHOPPING	1,760	11.8	6.41	11,278	32.5	27.5	24.8	77.3	216.6	423.0	0.7
		OTHER	1,100	15.5	9.01	9,914	35.0	22.1	21.7	68.0	184.7	387.8	0.7
TOTALS:		WORK	1,975	14.3	8.76	17,306	36.9	43.1	40.8	118.7	368.0	870.5	1.1
		SHOPPING	2,258	11.6	6.28	14,186	32.5	35.5	31.4	97.3	274.0	536.0	0.9
		OTHER	1,411	15.5	9.04	12,753	35.0	28.7	27.9	87.5	237.0	497.2	0.8
			5,644	13.5	7.84	44,245	34.8	107.2	100.0	303.4	878.9	1903.6	2.9
	Base-Related Travel		1,975			17,306		43.1	40.8	118.7	368.0	870.5	1.1
	Other Household Travel		3,669			26,939		64.1	59.3	184.7	510.9	1033.1	1.8

Notes: VMT = vehicle miles traveled
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter
VMT = vehicle miles traveled

TABLE D-41. TRIP PURPOSE DISSAGGREGATION AND TRAVEL SPEED DISTRIBUTIONS: NAF EL CENTRO ALTERNATIVE

Land Use	Trip Estimate Basis	Trip Purpose	Percent of Net Trips	Net Trip Rates	TCM Program Effect	Adjusted Net Trip Rate	Adjusted Net Trips	Overall TCM Effectiveness	Mean Trip Duration (Minutes)	Percent of Travel Time by Speed (mph)				
										15	25	35	45	55
On-Base Housing	311 Personnel	WORK	35.0%	1.4	0%	1.4	435		7.68	80.0%	20.0%	0.0%	0.0%	0.0%
		SHOPPING	40.0%	1.6	0%	1.6	498		10.78	10.0%	35.0%	35.0%	10.0%	10.0%
		OTHER	25.0%	1.0	0%	1.0	311		15.65	10.0%	25.0%	35.0%	15.0%	15.0%
Off-Base Housing	742 Personnel	WORK	35.0%	2.3	0%	2.3	1,688		16.08	5.0%	25.0%	30.0%	20.0%	20.0%
		SHOPPING	40.0%	2.6	0%	2.6	1,929		12.83	10.0%	35.0%	35.0%	10.0%	10.0%
		OTHER	25.0%	1.6	0%	1.6	1,206		17.43	10.0%	25.0%	35.0%	15.0%	15.0%
TOTALS							6,067	0.0%						

Note: TCM = transportation control measures

TABLE D-42. VEHICLE EMISSIONS FOR E-2 PERSONNEL: NAF EL CENTRO ALTERNATIVE

LAND USE	TRIP ESTIMATE BASIS	TRIP PURPOSE	AVERAGE DAILY TRIPS	MEAN TRIP DURATION (MINUTES)	AVERAGE DISTANCE (MILES)	DAILY VMT BY TRIP PURPOSE	AVERAGE TRAVEL SPEED (MPH)	ROG Emissions (lbs/day)	NOx Emissions (lbs/day)	PM10 Emissions (lbs/day)	Summer CO Emissions (lbs/day)	Winter CO Emissions (lbs/day)	SOx Emissions (lbs/day)
On-Base Housing	311 Personnel	WORK	435	7.7	2.18	947	17.0	6.2	2.5	6.5	30.2	45.5	0.1
		SHOPPING	498	10.8	5.84	2,908	32.5	8.5	6.6	19.9	59.4	78.0	0.2
		OTHER	311	15.7	9.13	2,839	35.0	7.0	6.2	19.5	53.7	75.0	0.2
Off-Base Housing	742 Personnel	WORK	1,688	16.1	10.05	16,964	37.5	41.9	40.4	116.3	367.2	574.5	1.1
		SHOPPING	1,929	12.8	6.95	13,406	32.5	33.5	29.3	91.9	261.6	340.5	0.9
		OTHER	1,206	17.4	10.17	12,262	35.0	27.5	26.5	84.1	228.5	317.7	0.8
TOTALS:		WORK	2,123	14.4	8.44	17,911	35.2	48.1	42.9	122.8	397.4	620.0	1.2
		SHOPPING	2,427	12.4	6.72	16,314	32.5	42.1	35.8	111.9	321.0	418.5	1.1
		OTHER	1,517	17.1	9.95	15,101	35.0	34.4	32.7	103.6	282.2	392.7	1.0
			6,067	14.3	8.13	49,326	34.2	124.6	111.5	338.3	1000.7	1431.3	3.3
	Base-Related Travel		2,123			17,911		48.1	42.9	122.8	397.4	620.0	1.2
	Other Household Travel		3,944			31,415		76.5	68.5	215.4	603.2	811.3	2.1

Notes: VMT = vehicle miles traveled
ROG = reactive organic compounds
NOx = nitrogen oxides
CO = carbon monoxide
SOx = sulfur oxides
PM10 = inhalable particulate matter
VMT = vehicle miles traveled

Data for Carbon Monoxide Dispersion Modeling

TABLE D-43. EMISSION FACTOR ADJUSTMENTS FOR EXTENDED ENGINE IDLING TIME: STANDARDIZED IDLE ADJUSTMENT LINKS

INPUT VARIABLES	MUGU1	MUGU2	MUGU3	MUGU4	LEM1	LEM2	LEM3	LEM4	ELC1	ELC2	ELC3	ELC4	NI1	NI2	NI3	NI4
SPEED (MPH) FOR BASE EMISSION RATE	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
LINK LENGTH, FEET	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
DELAY PER VEHICLE, SECONDS OF IDLE	20	30	40	50	20	30	40	50	20	30	40	50	20	30	40	50
BASE EMISSION RATE, GM/MI	12.42	12.42	12.42	12.42	14.59	14.59	14.59	14.59	16.88	16.88	16.88	16.88	12.42	9.90	12.42	12.42
100% STABILIZED 5 MPH RATE, GM/MI	16.71	16.71	16.71	16.71	16.71	16.71	16.71	16.71	17.92	17.92	17.92	17.92	16.71	16.71	16.71	16.71
100% STABILIZED 16 MPH RATE, GM/MI	6.52	6.52	6.52	6.52	6.52	6.52	6.52	6.52	6.99	6.99	6.99	6.99	6.52	6.52	6.52	6.52
100% COLD START 16 MPH RATE, GM/MI	22.19	22.19	22.19	22.19	22.19	22.19	22.19	22.19	27.26	27.26	27.26	27.26	22.19	22.19	22.19	22.19
% CATALYST VEHICLES	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05	98.05
% NON-CATALYST COLD STARTS	28.48	28.48	28.48	28.48	28.48	28.48	28.48	28.48	37.02	37.02	37.02	37.02	15.65	15.65	15.65	15.65
% CATALYST COLD STARTS	37.21	37.21	37.21	37.21	37.21	37.21	37.21	37.21	48.38	48.38	48.38	48.38	21.23	21.23	21.23	21.23
OUTPUT																
HOT STABILIZED IDLE RATE, GM/MIN	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.49	1.49	1.49	1.49	1.39	1.39	1.39	1.39
ADJUSTED COLD START 5 MPH RATE, GM/MI	56.87	56.87	56.87	56.87	56.87	56.87	56.87	56.87	69.89	69.89	69.89	69.89	56.87	56.87	56.87	56.87
COLD START IDLE RATE, GM/MIN	4.7392	4.7392	4.7392	4.7392	4.7392	4.7392	4.7392	4.7392	5.8238	5.8238	5.8238	5.8238	4.7392	4.7392	4.7392	4.7392
% IDLE TIME IN EMFAC/MOBILE RATES	25.39	25.39	25.39	25.39	25.39	25.39	25.39	25.39	25.39	25.39	25.39	25.39	25.39	25.39	25.39	25.39
IDLE SECONDS IN EMFAC/MOBILE RATES	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5.77
REQUIRED EXTRA IDLE SECONDS	14.23	24.23	34.23	44.23	14.23	24.23	34.23	44.23	14.23	24.23	34.23	44.23	14.23	24.23	34.23	44.23
WEIGHTED % COLD STARTS	37.04	37.04	37.04	37.04	37.04	37.04	37.04	37.04	48.16	48.16	48.16	48.16	21.12	21.12	21.12	21.12
WEIGHTED COLD/HOT IDLE RATE, GM/MIN	2.6321	2.6321	2.6321	2.6321	2.6321	2.6321	2.6321	2.6321	3.5788	3.5788	3.5788	3.5788	2.0994	2.0994	2.0994	2.0994
BASE EMISSION RATE, GM/MI	12.42	12.42	12.42	12.42	14.59	14.59	14.59	14.59	16.88	16.88	16.88	16.88	12.42	9.90	12.42	12.42
ADDED IDLE ADJUSTMENT, GM/MI	6.59	11.22	15.86	20.49	6.59	11.22	15.86	20.49	8.96	15.26	21.56	27.86	5.26	8.95	12.65	16.34
ADJUSTED EMISSION RATE, GM/MI	19.01	23.64	28.28	32.91	21.18	25.81	30.45	35.08	25.84	32.14	38.44	44.74	17.68	18.85	25.07	28.76
ADJUSTMENT FACTOR, % INCREASE	53.1%	90.4%	127.7%	165.0%	45.2%	76.9%	108.7%	140.4%	53.1%	90.4%	127.7%	165.0%	42.3%	90.4%	101.8%	131.6%

TABLE D-44. CALINE4 INPUT FILE FOR NAWS POINT MUGU ALTERNATIVE

```
    ' NAWS PT MUGU                                    '
    1 ,'CARBON MONOXIDE                  '
   50 ,   28.01 ,   0 ,   0 ,   4 ,   13 , 0.3048 ,   1 ,   1 ,    0
    ' GATE 1N                '
    ' GATE 1S                '
    ' GATE 2N                '
    ' GATE 2S                '
12032 ,    7279 ,       5
12084 ,    7193 ,       5
10454 ,    9733 ,       5
10514 ,    9640 ,       5
    ' HWY 1 N WOOD           '
    ' HWY 1 WD-LAS POSAS     '
    ' HWY 1 S LAS POSAS      '
    ' FRONTAGE RD 1          '
    ' FRONTAGE RD 2          '
    ' FRONTAGE RD 3          '
    ' N MUGU RD              '
    ' MAIN RD                '
    ' LAS POSAS              '
    ' IDLE FRNT1S            '
    ' IDLE FRNT2N            '
    ' IDLE FRNT2S            '
    ' IDLE FRNT3N            '
    1 ,    7097 ,   15613 ,    9462 ,   11828 ,  0 ,  76 ,  0 ,  0 ,  0
    1 ,    9462 ,   11828 ,   13484 ,    4436 ,  0 ,  76 ,  0 ,  0 ,  0
    1 ,   13484 ,    4436 ,   15495 ,    2543 ,  0 ,  76 ,  0 ,  0 ,  0
    1 ,    9758 ,   10941 ,   10527 ,    9758 ,  0 ,  58 ,  0 ,  0 ,  0
    1 ,   10527 ,    9758 ,   12124 ,    7274 ,  0 ,  58 ,  0 ,  0 ,  0
    1 ,   12124 ,    7274 ,   12952 ,    5855 ,  0 ,  58 ,  0 ,  0 ,  0
    1 ,   10527 ,    9758 ,    9285 ,    7688 ,  0 ,  58 ,  0 ,  0 ,  0
    1 ,   12124 ,    7274 ,    9758 ,    5914 ,  0 ,  58 ,  0 ,  0 ,  0
    1 ,   13484 ,    4436 ,   11946 ,    4731 ,  0 ,  58 ,  0 ,  0 ,  0
    1 ,   10254 ,   10177 ,   10527 ,    9758 ,  0 ,  58 ,  0 ,  0 ,  0
    1 ,   10527 ,    9758 ,   10797 ,    9337 ,  0 ,  58 ,  0 ,  0 ,  0
    1 ,   11860 ,    7699 ,   12124 ,    7274 ,  0 ,  58 ,  0 ,  0 ,  0
    1 ,   12124 ,    7274 ,   12388 ,    6849 ,  0 ,  58 ,  0 ,  0 ,  0
    1 ,       1 ,       1 ,       0 ,       1 ,'WIND DIR 1           '
 1823 ,    1349 ,    1349 ,    1390 ,     690 ,     222 ,     700 ,     175 ,
  200 ,    1390 ,     690 ,     690 ,     222
 8.57 ,    8.57 ,    8.57 ,    9.02 ,    9.02 ,    9.02 ,   12.42 ,   12.42 ,
12.42 ,    6.59 ,    6.59 ,    6.59 ,    6.59
    0 ,       1 ,       5 ,      50 ,      10 ,       0 ,      25
    1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 2           '
   10 ,       1 ,       5 ,      50 ,      10 ,       0 ,      25
    1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 3           '
   20 ,       1 ,       5 ,      50 ,      10 ,       0 ,      25
    1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 4           '
   30 ,       1 ,       5 ,      50 ,      10 ,       0 ,      25
```

TABLE D-44. CALINE4 INPUT FILE FOR NAWS POINT MUGU ALTERNATIVE

```
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 5          '
 40 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 6          '
 50 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 7          '
 60 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 8          '
 70 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 9          '
 80 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 10         '
 90 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 11         '
100 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 12         '
110 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 13         '
120 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 14         '
130 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 15         '
140 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 16         '
150 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 17         '
160 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 18         '
170 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 19         '
180 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 20         '
190 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 21         '
200 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 22         '
210 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 23         '
220 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 24         '
230 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 25         '
240 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 26         '
250 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 27         '
260 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 28         '
270 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
```

TABLE F-45. CALINE4 INPUT FILE FOR NAWS POINT MUGU ALTERNATIVE

```
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 29      '
280 ,     1 ,     5 ,    50 ,    10 ,     0 ,     25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 30      '
290 ,     1 ,     5 ,    50 ,    10 ,     0 ,     25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 31      '
300 ,     1 ,     5 ,    50 ,    10 ,     0 ,     25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 32      '
310 ,     1 ,     5 ,    50 ,    10 ,     0 ,     25
 .1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 33      '
320 ,     1 ,     5 ,    50 ,    10 ,     0 ,     25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 34      '
330 ,     1 ,     5 ,    50 ,    10 ,     0 ,     25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 35      '
340 ,     1 ,     5 ,    50 ,    10 ,     0 ,     25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 36      '
350 ,     1 ,     5 ,    50 ,    10 ,     0 ,     25
```

TABLE D-45. CALINE4 INPUT FILE FOR NAS LEMOORE ALTERNATIVE

```
 ' NAS LEMOORE                                                '
 1 ,'CARBON MONOXIDE                '
 50 ,   28.01 ,    0 ,   0 ,   4 ,   4 , 0.3048 ,   1 ,   1 ,   0
 ' RECEPTOR 1          '
 ' RECEPTOR 2          '
 ' RECEPTOR 3          '
 ' RECEPTOR 4          '
1950 ,    2075 ,       5
2050 ,    2075 ,       5
1950 ,    1925 ,       5
2050 ,    1925 ,       5
 ' SR 198 W            '
 ' SR 198 E            '
 ' MAIN GATE N         '
 ' MAIN GATE S         '
 1 ,       0 ,    2000 ,    2000 ,    2000 ,   0 ,  48 ,   0 ,   0 ,  0
 1 ,    2000 ,    2000 ,    4000 ,    2000 ,   0 ,  76 ,   0 ,   0 ,  0
 1 ,    2000 ,       0 ,    2000 ,    2000 ,   0 ,  58 ,   0 ,   0 ,  0
 1 ,    2000 ,    2000 ,    2000 ,    4000 ,   0 ,  58 ,   0 ,   0 ,  0
 1 ,       1 ,       1 ,       0 ,       1 ,'WIND DIR 1        '
 457 ,     957 ,     600 ,     100
10.98 ,  10.98 ,  21.18 ,  10.95
 0 ,       1 ,       5 ,      50 ,      10 ,       0 ,      25
 1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 2        '
 10 ,      1 ,       5 ,      50 ,      10 ,       0 ,      25
 1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 3        '
 20 ,      1 ,       5 ,      50 ,      10 ,       0 ,      25
 1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 4        '
 30 ,      1 ,       5 ,      50 ,      10 ,       0 ,      25
 1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 5        '
 40 ,      1 ,       5 ,      50 ,      10 ,       0 ,      25
 1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 6        '
 50 ,      1 ,       5 ,      50 ,      10 ,       0 ,      25
 1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 7        '
 60 ,      1 ,       5 ,      50 ,      10 ,       0 ,      25
 1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 8        '
 70 ,      1 ,       5 ,      50 ,      10 ,       0 ,      25
 1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 9        '
 80 ,      1 ,       5 ,      50 ,      10 ,       0 ,      25
 1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 10       '
 90 ,      1 ,       5 ,      50 ,      10 ,       0 ,      25
 1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 11       '
 100 ,     1 ,       5 ,      50 ,      10 ,       0 ,      25
 1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 12       '
 110 ,     1 ,       5 ,      50 ,      10 ,       0 ,      25
 1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 13       '
 120 ,     1 ,       5 ,      50 ,      10 ,       0 ,      25
```

TABLE D-45. CALINE4 INPUT FILE FOR NAS LEMOORE ALTERNATIVE

```
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 14      '
130 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 15      '
140 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 16      '
150 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 17      '
160 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 18      '
170 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 19      '
180 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 20      '
190 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 21      '
200 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 22      '
210 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 23      '
220 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 24      '
230 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 25      '
240 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 26      '
250 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 27      '
260 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 28      '
270 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 29      '
280 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 30      '
290 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 31      '
300 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 32      '
310 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 33      '
320 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 34      '
330 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 35      '
340 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
  1 ,    0 ,    0 ,    0 ,    1 ,'WIND DIR 36      '
350 ,    1 ,    5 ,   50 ,   10 ,       0 ,      25
```

TABLE D-46. CALINE4 INPUT FILE FOR NAF EL CENTRO ALTERNATIVE

```
 ' NAF EL CENTRO                                                '
  1 ,'CARBON MONOXIDE          '
 50 ,   28.01 ,       0 ,   0 ,   4 ,   8 ,  0.3048 ,   1 ,   1 ,. 0
  ' RECEPTOR 1          '
  ' RECEPTOR 2          '
  ' RECEPTOR 3          '
  ' RECEPTOR 4          '
1950 ,    2050 ,       5
2050 ,    2050 ,       5
1950 ,    1950 ,       5
2050 ,    1950 ,       5
  ' EVENS HEWES W       '
  ' EVANS HEWES E       '
  ' FORRESTER N         '
  ' FORRESTER S         '
  ' IDLE EH W           '
  ' IDLE EH E           '
  ' IDLE F N            '
  ' IDLE F S            '
  1 ,       0 ,    2000 ,    2000 ,    2000 , 0 ,  34 ,  0 ,  0 ,  0
  1 ,    2000 ,    2000 ,    4000 ,    2000 , 0 ,  34 ,  0 ,  0 ,  0
  1 ,    2000 ,       0 ,    2000 ,    2000 , 0 ,  34 ,  0 ,  0 ,  0
  1 ,    2000 ,    2000 ,    2000 ,    4000 , 0 ,  34 ,  0 ,  0 ,  0
  1 ,    1500 ,    2000 ,    2000 ,    2000 , 0 ,  34 ,  0 ,  0 ,  0
  1 ,    2000 ,    2000 ,    2500 ,    2000 , 0 ,  34 ,  0 ,  0 ,  0
  1 ,    2000 ,    1500 ,    2000 ,    2000 , 0 ,  34 ,  0 ,  0 ,  0
  1 ,    2000 ,    2000 ,    2000 ,    2500 , 0 ,  34 ,  0 ,  0 ,  0
  1 ,       1 ,       1 ,       0 ,       1 ,'WIND DIR 1        '
376 ,     613 ,     371 ,     612 ,     376 ,     613 ,     371 ,     612
13.24 ,  13.24 ,  13.24 ,  13.24 ,  12.6 ,   12.6 ,   12.6 ,   12.6
  0 ,       1 ,       5 ,      50 ,      10 ,       0 ,      25
  1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 2        '
 10 ,       1 ,       5 ,      50 ,      10 ,       0 ,      25
  1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 3        '
 20 ,       1 ,       5 ,      50 ,      10 ,       0 ,      25
  1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 4        '
 30 ,       1 ,       5 ,      50 ,      10 ,       0 ,      25
  1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 5        '
 40 ,       1 ,       5 ,      50 ,      10 ,       0 ,      25
  1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 6        '
 50 ,       1 ,       5 ,      50 ,      10 ,       0 ,      25
  1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 7        '
 60 ,       1 ,       5 ,      50 ,      10 ,       0 ,      25
  1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 8        '
 70 ,       1 ,       5 ,      50 ,      10 ,       0 ,      25
  1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 9        '
 80 ,       1 ,       5 ,      50 ,      10 ,       0 ,      25
  1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 10       '
 90 ,       1 ,       5 ,      50 ,      10 ,       0 ,      25
  1 ,       0 ,       0 ,       0 ,       1 ,'WIND DIR 11       '
100 ,       1 ,       5 ,      50 ,      10 ,       0 ,      25
```

TABLE D-46. CALINE4 INPUT FILE FOR NAF EL CENTRO ALTERNATIVE

```
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 12          '
110 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 13          '
120 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 14          '
130 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 15          '
140 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 16          '
150 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 17          '
160 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 18          '
170 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 19          '
180 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 20          '
190 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 21          '
200 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 22          '
210 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 23          '
220 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 24          '
230 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 25          '
240 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 26          '
250 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 27          '
260 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 28          '
270 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 29          '
280 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 30          '
290 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 31          '
300 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 32          '
310 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 33          '
320 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 34          '
330 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 35          '
340 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
  1 ,     0 ,     0 ,     0 ,     1 ,'WIND DIR 36          '
350 ,     1 ,     5 ,    50 ,    10 ,       0 ,      25
```

F/A-18 E/F Emissions Analysis (Cumulative)

TABLE D-47. DATA USED TO ESTIMATE EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Number of Engines	Engine Models Used For Emissions Analysis	Annual Flight Operations	Flight Activity	Fraction of Annual Flight Operations	Flight Mode	Engine Power or Thrust Setting	Total Annual Flight Operations	Average Daily Flight Operations		Time In Mode (minutes)	Fuel Flow Rate per Engine (lb/hr)	Modal Emission Rate (pounds per 1,000 pounds fuel flow)				
									Spring - Fall	Winter			Total Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F-18E/F	2	F414-GE-400	152,800	Departure	7.21%	Checks	G Idle	11,010	32.1	24.2	12.0	749	21.05	3.29	88.85	0.40	12.75
		F404-GE-400			7.21%	Taxi out	G Idle	11,010	32.1	24.2	5.9	749	21.05	3.29	88.85	0.40	12.75
					0.72%	AB Takeoff	Max AB	1,101	3.2	2.4	0.4	35,603	4.72	9.47	262.12	0.40	1.66
					6.48%	NoAB Takeoff	IRP	9,909	28.9	21.8	0.5	10,986	0.19	34.94	0.69	0.40	1.66
					7.21%	Climbout	IRP	11,010	32.1	24.2	0.7	10,986	0.19	34.94	0.69	0.40	1.66
				Arrival	1.37%	Straight In	85% rpm	2,100	6.1	4.6	1.6	3,357	0.19	9.71	1.40	0.40	6.55
					5.83%	Overhead In	85% rpm	8,910	26.0	19.6	2.9	3,357	0.19	9.71	1.40	0.40	6.55
					7.21%	Taxi in	G Idle	11,010	32.1	24.2	5.9	749	21.05	3.29	88.85	0.40	12.75
					5.76%	Hot Refuel	G Idle	8,808	25.7	19.4	11.0	749	21.05	3.29	88.85	0.40	12.75
				Touch-and-Go	19.46%	Approach	85% rpm	29,738	86.8	65.4	1.5	3,357	0.19	9.71	1.40	0.40	6.55
					19.46%	Climbout	IRP	29,738	86.8	65.4	0.3	10,986	0.19	34.94	0.69	0.40	1.66
					19.46%	Circle	85% rpm	29,738	86.8	65.4	1.5	3,357	0.19	9.71	1.40	0.40	6.55
				FCLP	20.56%	Approach	85% rpm	31,422	91.7	69.1	2.9	3,357	0.19	9.71	1.40	0.40	6.55
					20.56%	Climbout	IRP	31,422	91.7	69.1	0.3	10,986	0.19	34.94	0.69	0.40	1.66
					20.56%	Circle	85% rpm	31,422	91.7	69.1	3.0	3,357	0.19	9.71	1.40	0.40	6.55
				GCA Box	1.99%	Approach	85% rpm	3,046	8.9	6.7	4.0	3,357	0.19	9.71	1.40	0.40	6.55
					1.99%	Climbout	IRP	3,046	8.9	6.7	0.7	10,986	0.19	34.94	0.69	0.40	1.66
					1.99%	Circle	85% rpm	3,046	8.9	6.7	4.0	3,357	0.19	9.71	1.40	0.40	6.55
				ACLS	0.77%	Approach	85% rpm	1,184	3.5	2.6	2.9	3,357	0.19	9.71	1.40	0.40	6.55
					0.77%	Climbout	IRP	1,184	3.5	2.6	0.3	10,986	0.19	34.94	0.69	0.40	1.66
					0.77%	Circle	85% rpm	1,184	3.5	2.6	3.0	3,357	0.19	9.71	1.40	0.40	6.55
F-18E/F subtotal below 3,000 feet					100.00%			152,800	446.0	336.0							

TABLE D-47. DATA USED TO ESTIMATE EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Notes:

FLCP = field carrier landing practice
GCA = ground controlled approach
ACLS = automatic carrier landing system
G Idle = ground idle
AB = afterburner
IRP = intermediate rated power (equivalent to military power setting)
M Cont = maximum continuous power setting

Annual flight operation estimates for F/A-18E/F aircraft provided by Navy personnel.
Departures and arrivals each represent a single flight operation; pattern events (T&G, FCLP, GCA box, ACLS) each represent two flight operations (an approach and a climbout).
Flight operation totals and subtotals are the sum of approach mode and takeoff/climbout mode numbers.
Time-in-mode estimates for F/A-18 operations below 3,000 feet based on Thompson 1997 and Table II-1-4 of AP-42 Volume II.
Engine power setting assumptions based on data from Navy Aircraft Environmental Support Office (AESO) personnel, NAS Lemoore personnel, and Table II-1-6 of AP-42 Volume II.
F/A-18 takeoffs assume 10% max afterburner use for departures and no afterburner use for touch-and-go, FCLP, or GCA patterns.
Aircraft engine emission rates based on data from AESO Report 6-90, Table II-1-8 of AP-42 Volume II, and AESO data for F414-GE-400 engines.
Particulate matter emission rates for F/A-18E/F aircraft based on F404-GE-400 engine data from AESO, adjusting for fuel flow rates of F414-GE-400 engines.
F/A-18 aircraft taxi/idle times assume 100% ground idle conditions.
Sulfur oxide emissions assume a fixed emission rate of 0.4 pounds per 1,000 pounds of fuel (0.02% fuel sulfur content).
Typical day operations assume 80% of annual operations during spring through fall (274 days) and 20% of annual operations during winter (91 days).
All values independently rounded for display after calculation.

Data Sources:

Wyle Research, 1994. Aircraft Noise Study for Naval Air Station Lemoore, California (WR 94-17).
Thompson, S., 1997. 7-18-97 E-Mail memo from Lt. Thompson, E/F FIT, NAS Lemoore re. best estimates for time-in-mode values, F/A-18 E/F aircraft.
U.S. Navy, 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO Report No. 6-90).
U.S. Navy, 1996. Gaseous Emission Estimates for the F/A-18E/F Hornet and the F414-GE-100 Engine, Revision A (AESO Memo Report No. 9619A.).
U.S. Navy, 1997. Gaseous and Particulate Emission Indexes for the F414 Turbofan Engine - Draft. (AESO Memo Report No. 9725.).
U.S. Environmental Protection Agency, 1992. Procedures for Emission Inventory Preparation. Volume IV: Mobile Sources (EPA-450/4-81-026d(revised)).
U.S. Environmental Protection Agency, 1985. Compilation of Air Pollutant Emission Factors, Volume II (AP-42).

TABLE D-48. ESTIMATED EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Aircraft Type	Flight Activity	Flight Mode	Average Daily Summer Emissions (pounds/day)					Average Daily Winter Emissions (pounds/day)					Total Emissions from Annual Flight Operations (tons/year)				
			Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter	Reactive Organics	Nitrogen Oxides	Carbon Monoxide	Sulfur Oxides	Particulate Matter
F-18E/F	Departure	Checks	202.4	31.6	854.5	3.8	122.6	152.6	23.9	644.2	2.9	92.4	34.72	5.43	146.54	0.66	21.03
		Taxi out	99.5	15.6	420.1	1.9	60.3	75.0	11.7	316.7	1.4	45.5	17.07	2.67	72.05	0.32	10.34
		AB Takeoff	7.2	14.4	398.2	0.6	2.5	5.4	10.8	298.6	0.5	1.9	1.23	2.47	68.50	0.10	0.43
		NoAB Takeoff	1.0	184.9	3.7	2.1	8.8	0.8	139.5	2.8	1.6	6.6	0.17	31.70	0.63	0.36	1.51
		Climbout	1.6	287.5	5.7	3.3	13.7	1.2	216.7	4.3	2.5	10.3	0.27	49.31	0.97	0.56	2.34
	Arrival	Straight In	0.2	10.6	1.5	0.4	7.2	0.2	8.0	1.2	0.3	5.4	0.04	1.83	0.26	0.08	1.23
		Overhead In	1.6	81.9	11.8	3.4	55.3	1.2	61.8	8.9	2.5	41.7	0.27	14.04	2.02	0.58	9.47
		Taxi in	99.5	15.6	420.1	1.9	60.3	75.0	11.7	316.7	1.4	45.5	17.07	2.67	72.05	0.32	10.34
		Hot Refuel	148.6	23.2	627.1	2.8	90.0	112.2	17.5	473.4	2.1	67.9	25.46	3.98	107.46	0.48	15.42
	Touch-and-Go	Approach	2.8	141.5	20.4	5.8	95.4	2.1	106.6	15.4	4.4	71.9	0.47	24.23	3.49	1.00	16.35
		Climbout	1.8	333.2	6.6	3.8	15.8	1.4	251.0	5.0	2.9	11.9	0.31	57.07	1.13	0.65	2.71
		Circle	2.8	141.5	20.4	5.8	95.4	2.1	106.6	15.4	4.4	71.9	0.47	24.23	3.49	1.00	16.35
	FCLP	Approach	5.7	288.9	41.7	11.9	194.9	4.3	217.7	31.4	9.0	146.9	0.97	49.51	7.14	2.04	33.39
		Climbout	1.9	352.0	7.0	4.0	16.7	1.4	265.2	5.2	3.0	12.6	0.33	60.31	1.19	0.69	2.87
		Circle	5.8	298.9	43.1	12.3	201.6	4.4	225.2	32.5	9.3	151.9	1.00	51.21	7.38	2.11	34.55
	GCA Box	Approach	0.8	38.7	5.6	1.6	26.1	0.6	29.1	4.2	1.2	19.6	0.13	6.62	0.95	0.27	4.47
		Climbout	0.4	79.7	1.6	0.9	3.8	0.3	60.0	1.2	0.7	2.9	0.07	13.64	0.27	0.16	0.65
		Circle	0.8	38.7	5.6	1.6	26.1	0.6	29.1	4.2	1.2	19.6	0.13	6.62	0.95	0.27	4.47
	ACLS	Approach	0.2	11.0	1.6	0.5	7.4	0.2	8.2	1.2	0.3	5.5	0.04	1.87	0.27	0.08	1.26
		Climbout	0.1	13.4	0.3	0.2	0.6	0.1	10.0	0.2	0.1	0.5	0.01	2.27	0.04	0.03	0.11
		Circle	0.2	11.4	1.6	0.5	7.7	0.2	8.5	1.2	0.3	5.7	0.04	1.93	0.28	0.08	1.30
F-18E/F below 3,000 feet			584.9	2,414.2	2,898.0	69.2	1,112.3	441.0	1,818.9	2,183.7	52.1	838.1	100.3	413.6	497.1	11.9	190.6

TABLE D-48. ESTIMATED EMISSIONS FROM ADDED F/A-18E/F AIR OPERATIONS

Notes:

FLCP = field carrier landing practice
GCA = ground controlled approach
ACLS = automatic carrier landing system
G Idle = ground idle
AB = afterburner
IRP = intermediate rated power (equivalent to military power setting)
M Cont = maximum continuous power setting

Typical day operations assume 80% of annual operations during spring through fall (274 days) and 20% of annual operations during winter (91 days).

Data Sources:

Wyle Research, 1994. Aircraft Noise Study for Naval Air Station Lemoore, California (WR 94-17).
Thompson, S., 1997. 7-18-97 E-Mail memo from Lt. Thompson, E/F FIT, NAS Lemoore re. best estimates for time-in-mode values, F/A-18 E/F aircraft.
U.S. Navy, 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines (AESO Report No. 6-90).
U.S. Navy, 1996. Gaseous Emission Estimates for the F/A-18E/F Hornet and the F414-GE-100 Engine, Revision A (AESO Memo Report No. 9619A.).
U.S. Navy, 1997. Gaseous and Particulate Emission Indexes for the F414 Turbofan Engine - Draft. (AESO Memo Report No. 9725.).
U.S. Environmental Protection Agency, 1992. Procedures for Emission Inventory Preparation. Volume IV: Mobile Sources (EPA-450/4-81-026d(revised)).
U.S. Environmental Protection Agency, 1985. Compilation of Air Pollutant Emission Factors, Volume II (AP-42).

Clean Air Act Conformity Emissions Summary for the NAWS Point Mugu Alternative

TABLE D-49A. ANNUAL EMISSIONS FOR E-2 SQUADRON ACTIVITY, NAWS POINT MUGU ALTERNATIVE

YEAR	EMISSIONS COMPONENT	ESTIMATED ANNUAL EMISSIONS, TONS PER YEAR: REACTIVE ORGANIC COMPOUNDS	NITROGEN OXIDES	CARBON MONOXIDE	SULFUR OXIDES	PM10
1998	Construction Activity	0.26	3.56	1.88	0.35	2.43
	E-2 Operations	7.24	12.30	10.08	0.57	3.57
	E-2 Engine Run-Ups	0.39	1.08	0.56	0.05	0.31
	Aircraft Fuel Transfers	0.05	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	0.66	0.99	12.47	0.05	0.09
	Other Pemit-Exempt Equipment	0.01	0.07	0.06	0.00	0.00
	On-Base Natural Gas Use	0.00	0.02	0.02	0.00	0.00
	Added Base-Related Traffic	2.30	1.91	26.27	0.05	5.14
	1998 CAA Conformity Total	10.90	19.94	51.35	1.07	11.55
1999	Construction Activity	0.00	0.00	0.00	0.00	0.00
	E-2 Operations	21.72	36.91	30.25	1.71	10.71
	E-2 Engine Run-Ups	1.17	3.24	1.69	0.14	0.93
	Aircraft Fuel Transfers	0.15	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	1.98	2.98	37.41	0.15	0.27
	Other Pemit-Exempt Equipment	0.02	0.21	0.19	0.01	0.01
	On-Base Natural Gas Use	0.00	0.07	0.05	0.00	0.01
	Added Base-Related Traffic	6.91	5.74	78.80	0.15	15.43
	1999 CAA Conformity Total	31.95	49.16	148.39	2.17	27.36
2000+	E-2 Operations	21.72	36.91	30.25	1.71	10.71
	E-2 Engine Run-Ups	1.17	3.24	1.69	0.14	0.93
	Aircraft Fuel Transfers	0.15	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	1.98	2.98	37.41	0.15	0.27
	Other Pemit-Exempt Equipment	0.02	0.21	0.19	0.01	0.01
	On-Base Natural Gas Use	0.00	0.07	0.05	0.00	0.01
	Added Base-Related Traffic	6.91	5.74	78.80	0.15	15.43
	2000+ CAA Conformity Total	31.95	49.16	148.39	2.17	27.36
	Maximum CAA Conformity Analysis Emissions	31.95	49.16	148.39	2.17	27.36
	De Minimis Threshold	25.00	25.00	na	na	na
	Above De Minimis Level?	YES	YES	NO	NO	NO
	On-base Emission Reductions Not Included in SIP Forecasts	-54.34	-65.92	-111.81	-21.16	-24.89
	Conformity Emissions Change	-22.39	-16.76	36.58	-18.99	2.47
	Conformity Offset Requirements	none	none	none	none	none

TABLE D-49A. ANNUAL EMISSIONS FOR E-2 SQUADRON ACTIVITY, NAWS POINT MUGU ALTERNATIVE

Notes: Construction emission estimates assume 4.2 acres disturbed and 3,000 hours of heavy equipment operation in 1998; no construction projects would be initiated in 1999.
Except for construction activity, 1998 emissions are assumed to be one-third of 1999 emissions, to reflect staggered squadron arrivals between July and December.
E-2 aircraft operations for 1999 and later years assume 3,650 sorties per year with 34,100 total flight operations per year.
In-frame engine run-up emission estimates assume 51.6 30-minute engine tests plus 13 20-minute engine tests year per aircraft (826 30-minute tests and 208 20-minute tests).
Aircraft fuel transfer emissions assume 4.1 million gallons of JP-5 fuel used per year, with two splash-loading fuel transfers; 3 months of fuel transfers at 50 degrees F, 9 months of transfers at 60 degrees F.
Aircraft support equipment includes tow tractors, portable power units, cargo loaders, and other aircraft service vehicles.
Aircraft support equipment emission estimates assume 15 minutes of gasoline-powered equipment use and 15 minutes of diesel-powered equipment use for each aircraft takeoff and each aircraft landing.
Other permit-exempt equipment includes portable or stationary diesel and JP-5 engines used for pumps, compressors, hydraulic test stands, etc.
Emission estimates for other permit-exempt equipment assume 8,000 horsepower-hours of diesel engine use and 88 hours of hydraulic test stand JP-5 engine use.
On-base natural gas use emissions assume 1.72 million cubic feet per year of natural gas use for space heating and water heating in added office, industrial, and personnel-support buildings (10 BTU/hour/square foot heating energy demand).
Base-related vehicle traffic inlcudes only work-related trips (240 days per year).
NAWS Point Mugu emission reductions not included in the SIP include only those conformity-related emission source categories addressed for the E-2 realignment (aircraft operation, aircraft engine run-ups, aircraft refueling, on-base permit-exempt natural gas use, and base-related vehicle travel).

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Annual Emissions from NAS Lemoore "Huffers" and TSE.
Castro, Tim. 1997. 10-08-97 Fax, Title V Emissions Inventory, Sept 96-Aug 97: TITVREP.XLS Printout.
Hunn, Bruce D. (ed.). 1996. Fundamentals of Building Energy Dynamics.
U.S. Environmental Protection Agency. 1985. Compilation of Air Pollutant Emission Factors. 4th Edition. Volumes I and II. (AP-42).
U.S. Environmental Protection Agency. 1991. Nonroad Engine and Vehicle Emissions Study - Report. (21A-2001).
U.S. Environmental Protection Agency. 1992. Procedures for Emission Inventory Preparation. Volume IV: Mobile Sources. (EPA-450/4-81-126d (revised)).
U.S. Environmental Protection Agency. 1993. Compilation of Air Pollutant Emission Factors. 4th Edition. Volume I, Supplement F. (AP-42).
U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42).
U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines. (AESO Report No. 6-90).
U.S. Navy. 1997. Baseline Emission Reduction Study. NAWS Point Mugu Environmental Division.
U.S. Navy. 1997. Revised Emissions From All Sources For NAWS Point Mugu For 1990 And 1996. NAWS Point Mugu Environmental Division.

TABLE D-49B. SUMMARY OF 1990 - 1996 EMISSION REDUCTIONS AT NAWS POINT MUGU

YEAR	EMISSION SOURCE CATEGORY	ESTIMATED ANNUAL EMISSIONS, TONS PER YEAR				
		ROG	NOx	CO	SOx	PM10
1990	Aircraft Operations	66.83	115.62	208.72	26.27	48.72
	Engine Run-ups	9.58	5.27	nd	nd	nd
	Base-Related Vehicle Travel	21.51	29.54	nd	nd	nd
	Fuel Farm, JP-4 Jet Fuel	2.59	0.00	0.00	0.00	0.00
	Natural Gas Use, Housing	0.14	1.82	0.78	0.01	0.00
	CAA Conformity Subtotal	100.65	152.25	209.50	26.28	48.72
	Engine Test Cells	1.24	8.80	5.90	nd	3.54
	Coating and Cleaning	10.39	0.00	0.00	0.00	0.00
	Diesel Engines	3.22	45.54	3.25	9.91	3.03
	Gasoline Engines	4.09	2.86	111.72	0.15	0.18
	Incinerator	0.01	0.08	0.01	nd	0.06
	Fuel Farm, Aviation Gasoline	2.71	0.00	0.00	0.00	0.00
	Fuel Farm, Vehicle Gasoline	1.95	0.00	0.00	0.00	0.00
	Fuel Oil Boilers	0.01	0.54	0.14	1.17	0.05
	Natural Gas Low NOx Boilers	0.00	0.00	0.00	0.00	0.00
	Navy Exchange Gas Station	0.97	0.00	0.00	0.00	0.00
	Public Works Gas Station	0.26	0.00	0.00	0.00	0.00
	Stationary Source Subtotal	24.85	57.82	121.02	11.23	6.86
	Other Natural Gas Use	0.31	5.75	1.15	0.03	0.17
	Government Vehicles	8.40	7.56	60.48	0.34	0.39
	Propane Combustion	0.00	0.05	0.00	0.00	0.00
	Lawn Mowers	11.80	1.69	nd	nd	nd
	Other Emission Sources	20.51	15.05	61.63	0.37	0.56
	Total Base-Related Emissions	146.01	225.12	392.15	37.88	56.14

TABLE D-49B. SUMMARY OF 1990 - 1996 EMISSION REDUCTIONS AT NAWS POINT MUGU

YEAR	EMISSION SOURCE CATEGORY	ESTIMATED ANNUAL EMISSIONS, TONS PER YEAR				
		ROG	NOx	CO	SOx	PM10
1996	Aircraft Operations	33.12	67.19	97.04	5.11	23.83
	Engine Run-ups	4.31	3.06	nd	nd	nd
	Base-Related Vehicle Travel	8.76	14.54	nd	nd	nd
	Fuel Farm, JP-8 Jet Fuel	0.00	0.00	0.00	0.00	0.00
	Natural Gas Use, Housing	0.12	1.54	0.65	0.01	0.00
	CAA Conformity Subtotal	46.31	86.33	97.69	5.12	23.83
	Engine Test Cells	0.13	2.40	1.14	0.46	1.15
	Coating and Cleaning	3.66	0.00	0.00	0.00	0.00
	Diesel Engines	1.64	23.26	1.66	5.06	1.55
	Gasoline Engines	3.45	2.41	94.16	0.13	0.15
	Incinerator	0.00	0.00	0.00	0.00	0.00
	Fuel Farm, Aviation Gasoline	2.71	0.00	0.00	0.00	0.00
	Fuel Farm, Vehicle Gasoline	1.95	0.00	0.00	0.00	0.00
	Fuel Oil Boilers	0.00	0.06	0.01	0.13	0.01
	Natural Gas Low NOx Boilers	0.09	0.71	0.35	0.01	0.05
	Navy Exchange Gas Station	0.89	0.00	0.00	0.00	0.00
	Public Works Gas Station	0.21	0.00	0.00	0.00	0.00
	Stationary Source Subtotal	14.73	28.84	97.32	5.79	2.91
	Other Natural Gas Use	0.17	3.22	0.64	0.02	0.10
	Government Vehicles	7.08	6.37	50.98	0.28	0.33
	Propane Combustion	0.00	0.00	0.00	0.00	0.00
	Lawn Mowers	11.80	1.69	nd	nd	nd
	Other Emission Sources	19.05	11.28	51.62	0.30	0.43
	Total Base-Related Emissions	80.09	126.45	246.63	11.21	27.17
1990-1996 Change	CAA Conformity Subtotal	-54.34	-65.92	-111.81	-21.16	-24.89
	Stationary Source Subtotal	-10.12	-28.98	-23.70	-5.44	-3.95
	Other Emission Sources	-1.46	-3.77	-10.01	-0.07	-0.13
	Total Base-Related Emissions	-65.92	-98.67	-145.52	-26.67	-28.97

Note: CAA conformity subtotals include only those emission source categories that do not include stationary sources and which have been evaluated in connection with the E-2 realignment.

Source: U.S. Navy. 1997. Revised Emissions From All Sources For NAWS Point Mugu for 1990 and 1996. NAWS Point Mugu Environmental Division.

TABLE D-49C

Emissions Associated With Aircraft Removed from Point Mugu Between 1990 and 1996

A/C Type	# of A/C Removed	Activity	# of Landing/ Takeoff Operations	# of Touch and Go Operations	CO (Tons)	NOx (Tons)	ROC (Tons)	SOx (Tons)	PM10 (Tons)
A-3	7	VAQ-34	1,290	664	12.94	2.47	15.05	0.81	4.96
A-6	3	PMTC Flight Test	125	686	1.20	0.53	0.27	0.17	1.13
A-7	14	VAQ-34, PMTC Flight Test	2,079	2,712	12.27	6.75	6.52	0.92	2.69
F-4	1	VX-4	84	130	1.78	0.26	0.49	0.11	0.29
F-14	2	VX-4	222	264	2.18	0.99	0.76	0.28	0.44
F-18	19	VX-4, VFA-305, PMTC Flight Test	3,428	6,450	54.65	29.11	13.97	4.60	10.66
F-86	8	Target Ops.	572	460	2.90	0.67	3.35	0.21	1.23
H-46	3	SAR Helos	551	2,544	4.67	0.97	1.37	0.43	0.80
UH-1	5	VXE-6	1,698	19,528	2.03	4.61	0.35	1.58	2.87
C-12	2	PMTC Flight Test	746	1,834	1.67	0.38	0.97	0.12	0.15
C-130	1	Air National Guard	102	356	0.25	1.31	0.06	0.29	0.34
CV-440	2	Renown Aviation (Replaced by CV-580)	1,440		41.92	0.24	5.97	0.19	0.04
		Total:	12,337	35,518					
Total Operations:		47,855							
Total Emission Reduction Accountable to Permanently Removed Aircraft:					**138.46**	**48.29**	**49.15**	**9.69**	**25.60**

NOTES:

Except in the case of CV-440, the # of operations attributable to removed aircraft are calculated by assuming the number of operations to be proportional to # of aircraft removed, with this proportion then applied to 1990 operations.

Each landing is recorded as one operation, each takeoff is recorded as one operation, and each touch and go is recorded as two operations

This page intentionally left blank.

Conformity Determination for the NAS Lemoore Alternative

CLEAN AIR ACT CONFORMITY DETERMINATION
REALIGNMENT OF E-2 SQUADRONS FROM NAS MIRAMAR TO NAS LEMOORE

APPLICABILITY ANALYSIS

NAS Lemoore straddles the boundary between Fresno and Kings Counties, California. Both Fresno County and Kings County are part of the San Joaquin Valley Air Basin. The San Joaquin Valley Air Basin is designated a severe ozone nonattainment area and a severe PM_{10} nonattainment area. As indicated subsequently in Table D-50, direct and indirect emissions of nitrogen oxides associated with the E-2 realignment exceed the *de minimis* threshold of 50 tons per year for ozone precursors. Consequently, Clean Air Act conformity determination requirements apply to realignment of E-2 aircraft to NAS Lemoore.

Some emission sources associated with the E-2 realignment action are exempt from consideration under the general conformity rule. Exempt emission sources include stationary sources that require permits from the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) and emission sources that are not under Navy control.

Various new facilities would be needed at NAS Lemoore to support the E-2 realignment. Some of these facilities would include equipment that would require air quality permits from the SJVUAPCD. Facilities and equipment covered by new, existing, or amended, SJVUAPCD permits are exempt from consideration in a conformity determination. Examples of emission sources that are exempt from consideration in a conformity determination include engine test cells; boilers used for space heating and water heating; and various painting, degreasing, and abrasive blasting facilities used for aircraft and engine maintenance.

Some portable equipment associated with aircraft maintenance activities plus some equipment associated with aircraft flight operations may be subject to SJVUAPCD permit requirements. For some of this equipment, the Navy has the option of registering the equipment as a mobile source instead of having it permitted as a stationary source. For purposes of this conformity determination, all such equipment has been treated as permit-exempt mobile source equipment, and included in the conformity analysis.

Vehicle travel associated with added military and civilian personnel has been separated into base-related travel (work-related trips) and other household travel (shopping and other nonwork trips). Emissions associated with base-related travel are included in the conformity analysis. Emissions associated with off-base housing units (space heating, water heating, etc.) are not under Navy control, and are excluded from the conformity analysis.

SUMMARY OF ADDED EMISSIONS

Conformity-related emission estimates for the E-2 realignment action are summarized in Table D-50. The maximum annual conformity-related emissions will be 31.4 tons per year of reactive organic compounds, 52.3 tons per year of nitrogen oxides, and 31.6 tons per year of PM_{10}. These emission quantities will decline slightly after 1999 because construction activities will be complete and emissions from motor vehicles will continue to decline slightly each year. For simplicity, this conformity analysis assumes that conformity-related emissions from the E-2 realignment action remain constant after the year 2000.

The conformity-related increase in reactive organic compound emissions (31.4 tons per year) is less than the *de minimis* level of 50 tons per year for the San Joaquin Valley Air Basin. In addition, the conformity-related increase in PM_{10} emissions is less than the *de minimis* level of 70 tons per year for the San Joaquin Valley Air Basin. Only the conformity-related emissions of nitrogen oxides exceed the relevant *de minimis* level (50 tons per year). Consequently, the conformity determination for the realignment of E-2 aircraft to NAS Lemoore only needs to address nitrogen oxide emissions.

EMISSION INCREASES INCLUDE IN THE OZONE SIP FOR THE SAN JOAQUIN VALLEY

The ozone SIP for the San Joaquin Valley uses 1990 as a base year. Emission forecasts in the ozone SIP show an increase in emissions from government aircraft operations in Kings County between 1990 and 1996, with emissions remaining at the 1996 level through 1999. Nitrogen oxide emissions from government aircraft in Kings County are forecast to increase from 0.93 tons per day (339.45 tons per year) in 1990 to 1.11 tons per day (405.15 tons per year) in 1996. NAS Lemoore is the source of government aircraft emissions assigned to Kings County in the ozone SIP for the San Joaquin Valley.

STATEMENT OF CONFORMITY

Maximum conformity-related emissions of nitrogen oxides associated with realignment of E-2 aircraft to NAS Lemoore will be 52.3 tons per year. The ozone SIP for the San Joaquin Air Basin forecasts an increase of 65.7 tons per year in nitrogen oxide emissions from government aircraft based in Kings County. NAS Lemoore is the airfield used by government aircraft in Kings County. Because the increase in nitrogen oxide emissions associated with realignment of E-2 aircraft to NAS Lemoore is less than the comparable emission increase forecast in the ozone SIP for the San Joaquin Valley, the NAS Lemoore Alternative for realignment of E-2 aircraft conforms to the applicable SIP.

NAS Lemoore will follow SJVUAPCD procedures to ensure that new, relocated, or modified facilities and equipment meet applicable rules and regulations (including all SIP requirements) prior to facility construction or installation.

TABLE D-50. ANNUAL EMISSIONS FOR E-2 SQUADRON ACTIVITY, NAS LEMOORE ALTERNATIVE

YEAR	EMISSIONS COMPONENT	ESTIMATED ANNUAL EMISSIONS, TONS PER YEAR: REACTIVE ORGANIC COMPOUNDS	NITROGEN OXIDES	CARBON MONOXIDE	SULFUR OXIDES	PM10
1998	Construction Activity	1.07	17.23	7.90	1.78	16.73
	E-2 Operations	7.24	12.30	10.08	0.57	3.57
	E-2 Engine Run-Ups	0.39	1.08	0.56	0.05	0.31
	Aircraft Fuel Transfers	0.06	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	0.66	0.99	12.47	0.05	0.09
	Other Permit-Exempt Equipment	0.01	0.07	0.06	0.00	0.00
	On-Base Natural Gas Use	0.01	0.13	0.10	0.00	0.02
	Added Base-Related Traffic	2.06	1.95	29.02	0.06	5.71
	1998 CAA Conformity Total	11.49	33.75	60.19	2.51	26.43
1999	Construction Activity	0.17	2.70	1.35	0.27	2.49
	E-2 Operations	21.72	36.91	30.25	1.71	10.71
	E-2 Engine Run-Ups	1.17	3.24	1.69	0.14	0.93
	Aircraft Fuel Transfers	0.17	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	1.98	2.98	37.41	0.15	0.27
	Other Permit-Exempt Equipment	0.02	0.21	0.19	0.01	0.01
	On-Base Natural Gas Use	0.02	0.38	0.29	0.00	0.06
	Added Base-Related Traffic	6.19	5.84	87.06	0.17	17.14
	1999 CAA Conformity Total	31.42	52.27	158.23	2.46	31.61
2000+	E-2 Operations	21.72	36.91	30.25	1.71	10.71
	E-2 Engine Run-Ups	1.17	3.24	1.69	0.14	0.93
	Aircraft Fuel Transfers	0.17	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	1.98	2.98	37.41	0.15	0.27
	Other Permit-Exempt Equipment	0.02	0.21	0.19	0.01	0.01
	On-Base Natural Gas Use	0.02	0.38	0.29	0.00	0.06
	Added Base-Related Traffic	6.19	5.84	87.06	0.17	17.14
	2000+ CAA Conformity Total	31.26	49.56	156.88	2.19	29.12
	Maximum CAA Conformity Analysis Emissions	31.42	52.27	158.23	2.51	31.61
	De Minimis Threshold	50.00	50.00	na	na	70.00
	Above De Minimis Level?	NO	YES	NO	NO	NO
	NAS Lemoore Activity Increase Forecast in SIP	14.60	65.70	0.00	0.00	0.00
	Conformity Emissions Change	16.82	-13.43	158.23	2.51	31.61
	Conformity Offset Requirements	none	none	none	none	none

TABLE D-50. ANNUAL EMISSIONS FOR E-2 SQUADRON ACTIVITY, NAS LEMOORE ALTERNATIVE

Notes: Construction emission estimates assume 21 acres disturbed and 12,180 hours of heavy equipment operation in 1998, 4.5 acres disturbed and 1,990 hours of heavy equipment operation in 1999.
Except for construction activity, 1998 emissions are assumed to be one-third of 1999 emissions, to reflect staggered squadron arrivals between July and December.
E-2 aircraft operations for 1999 and later years assume 3,650 sorties per year with 34,100 total flight operations per year.
In-frame engine run-up emission estimates assume 51.6 30-minute engine tests plus 13 20-minute engine tests year per aircraft (826 30-minute tests and 208 20-minute tests).
Aircraft fuel transfer emission estimates assume 4.1 million gallons of JP-5 fuel used per year, with two splash-loading fuel transfers; 1 month of fuel transfers at 40 degrees F, 4 months of transfers at 50 degrees F, 1 month of fuel transfers at 60 degrees F, 4 months of fuel transfers at 70 degrees F, and 2 months of fuel transfers at 80 degrees F.
Aircraft support equipment includes tow tractors, portable power units, cargo loaders, and other aircraft service vehicles.
Aircraft support equipment emission estimates assume 15 minutes of gasoline-powered equipment use and 15 minutes of diesel-powered equipment use for each aircraft takeoff and each aircraft landing.
Other permit-exempt equipment includes portable or stationary diesel and JP-5 engines used for pumps, compressors, hydraulic test stands, etc.
Emission estimates for other permit-exempt equipment assume 8,000 horsepower-hours of diesel engine use and 88 hours of hydraulic test stand JP-5 engine use.
On-base natural gas use emissions assume 9.37 million cubic feet per year of natural gas use for space heating and water heating in added office, industrial, and personnel-support buildings (10 BTU/hour/square foot heating energy demand).
Base-related vehicle traffic inlcudes only work-related trips (240 days per year).
The ozone SIP for the San Joaquin Valley anticipated increased aircraft emissions at NAS Lemoore between 1990 and 1996.

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Annual Emissions from NAS Lemoore "Huffers" and TSE.
Castro, Tim. 1997. 10-08-97 Fax, Title V Emissions Inventory, Sept 96-Aug 97; TITVREP.XLS Printout.
Hunn, Bruce D. (ed.). 1996. Fundamentals of Building Energy Dynamics.
U.S. Environmental Protection Agency. 1985. Compilation of Air Pollutant Emission Factors. 4th Edition. Volumes I and II. (AP-42).
U.S. Environmental Protection Agency. 1991. Nonroad Engine and Vehicle Emissions Study - Report. (21A-2001).
U.S. Environmental Protection Agency. 1992. Procedures for Emission Inventory Preparation. Volume IV: Mobile Sources. (EPA-450/4-81-126d (revised)).
U.S. Environmental Protection Agency. 1993. Compilation of Air Pollutant Emission Factors. 4th Edition. Volume I, Supplement F. (AP-42).
U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42).
U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines. (AESO Report No. 6-90).

Record of Nonapplicability for the NAF El Centro Alternative

RECORD OF NONAPPLICABILITY
REALIGNMENT OF E-2 SQUADRONS FROM NAS MIRAMAR TO NAF EL CENTRO

NAF El Centro is located in the portion of Imperial County, California that is included within the Salton Sea Air Basin. The Salton Sea Air Basin is designated a transitional ozone nonattainment area and a moderate PM_{10} nonattainment area. The *de minimis* thresholds applicable to the Salton Sea Air Basin are 100 tons per year for reactive organic compounds, 100 tons per year for nitrogen oxides, and 100 tons per year for PM_{10}.

Conformity-related emission estimates for the E-2 realignment action are summarized in Table D-51. The maximum annual conformity-related emissions will be 31.1 tons per year of reactive organic compounds, 51.8 tons per year of nitrogen oxides, and 29.1 tons per year of PM_{10}. These emission quantities would decline slightly after 1999 because construction activities would be complete and emissions from motor vehicles will continue to decline slightly each year. For simplicity, this conformity analysis assumes that conformity-related emissions from the E-2 realignment action remain constant after the year 2000.

The conformity-related increases in nonattainment pollutants are all less than the relevant *de minimis* level for the Salton Sea Air Basin. Consequently, the NAF El Centro Alternative for the realignment of E-2 aircraft would be exempt from Clean Air Act conformity determination requirements pursuant to 40 CFR 51.853(c)(1).

TABLE D-51. ANNUAL EMISSIONS FOR E-2 SQUADRON ACTIVITY, NAF EL CENTRO ALTERNATIVE

YEAR	EMISSIONS COMPONENT	ESTIMATED ANNUAL EMISSIONS, TONS PER YEAR: REACTIVE ORGANIC COMPOUNDS	NITROGEN OXIDES	CARBON MONOXIDE	SULFUR OXIDES	PM10
1998	Construction Activity	1.13	18.20	8.33	1.88	17.73
	E-2 Operations	7.24	12.30	10.08	0.57	3.57
	E-2 Engine Run-Ups	0.39	1.08	0.56	0.05	0.31
	Aircraft Fuel Transfers	0.08	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	0.66	0.99	12.47	0.05	0.09
	Other Permit-Exempt Equipment	0.01	0.07	0.06	0.00	0.00
	On-Base Natural Gas Use	0.01	0.19	0.15	0.00	0.03
	Added Base-Related Traffic	1.92	1.72	20.35	0.05	4.91
	1998 CAA Conformity Total	11.44	34.56	52.00	2.60	26.65
1999	Construction Activity	0.17	2.70	1.35	0.27	2.36
	E-2 Operations	21.72	36.91	30.25	1.71	10.71
	E-2 Engine Run-Ups	1.17	3.24	1.69	0.14	0.93
	Aircraft Fuel Transfers	0.25	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	1.98	2.98	37.41	0.15	0.27
	Other Permit-Exempt Equipment	0.02	0.21	0.19	0.01	0.01
	On-Base Natural Gas Use	0.03	0.58	0.44	0.00	0.09
	Added Base-Related Traffic	5.77	5.15	61.05	0.14	14.74
	1999 CAA Conformity Total	31.10	51.79	132.37	2.44	29.11
2000+	E-2 Operations	21.72	36.91	30.25	1.71	10.71
	E-2 Engine Run-Ups	1.17	3.24	1.69	0.14	0.93
	Aircraft Fuel Transfers	0.25	0.00	0.00	0.00	0.00
	Aircraft Support Equipment	1.98	2.98	37.41	0.15	0.27
	Other Permit-Exempt Equipment	0.02	0.21	0.19	0.01	0.01
	On-Base Natural Gas Use	0.03	0.58	0.44	0.00	0.09
	Added Base-Related Traffic	5.77	5.15	61.05	0.14	14.74
	2000+ CAA Conformity Total	30.93	49.08	131.02	2.16	26.75
	Maximum CAA Conformity Analysis Emissions	31.10	51.79	132.37	2.60	29.11
	De Minimis Threshold	100.00	100.00	na	na	100.00
	Above De Minimis Level?	NO	NO	NO	NO	NO
	NAF El Centro Activity Increase Forecast in SIP	0.00	0.00	0.00	0.00	0.00
	Conformity Emissions Change	31.10	51.79	132.37	2.60	29.11
	Conformity Offset Requirements	none	none	none	none	none

TABLE D-51. ANNUAL EMISSIONS FOR E-2 SQUADRON ACTIVITY, NAF EL CENTRO ALTERNATIVE

Notes: Construction emission estimates assume 21.5 acres disturbed and 12,875 hours of heavy equipment operation in 1998, 4.3 acre disturbed and 1,990 hours of heavy equipment operation in 1999.
Except for construction activity, 1998 emissions are assumed to be one-third of 1999 emissions, to reflect staggered squadron arrivals between July and December.
E-2 aircraft operations for 1999 and later years assume 3,650 sorties per year with 34,100 total flight operations per year.
In-frame engine run-up emission estimates assume 51.6 30-minute engine tests plus 13 20-minute engine tests year per aircraft (826 30-minute tests and 208 20-minute tests).
Aircraft fuel transfer emission estimates assume 4.1 million gallons of JP-5 fuel used per year, with two splash-loading fuel transfers: 5 months of transfers at 60 degrees F, 1 month of fuel transfers at 70 degrees F, 2 months of fuel transfers at 80 degrees F, and 4 months of fuel transfers at 90 degrees F.
Aircraft support equipment includes tow tractors, portable power units, cargo loaders, and other aircraft service vehicles.
Aircraft support equipment emission estimates assume 15 minutes of gasoline-powered equipment use and 15 minutes of diesel-powered equipment use for each aircraft takeoff and each aircraft landing.
Other permit-exempt equipment includes portable or stationary diesel and JP-5 engines used for pumps, compressors, hydraulic test stands, etc.
Emission estimates for other permit-exempt equipment assume 8,000 horsepower-hours of diesel engine use and 88 hours of hydraulic test stand JP-5 engine use.
On-base natural gas use emissions assume 9.37 million cubic feet per year of natural gas use for space heating and water heating in added office, industrial, and personnel-support buildings (10 BTU/hour/square foot heating energy demand).
Base-related vehicle traffic inlcudes only work-related trips (240 days per year).

Data Sources:

Castro, Tim. 1997. 10-08-97 Fax, Annual Emissions from NAS Lemoore "Huffers" and TSE.
Castro, Tim. 1997. 10-08-97 Fax, Title V Emissions Inventory, Sept 96-Aug 97; TITVREP.XLS Printout.
Hunn, Bruce D. (ed.). 1996. Fundamentals of Building Energy Dynamics.
U.S. Environmental Protection Agency. 1985. Compilation of Air Pollutant Emission Factors. 4th Edition. Volumes I and II. (AP-42).
U.S. Environmental Protection Agency. 1991. Nonroad Engine and Vehicle Emissions Study - Report. (21A-2001).
U.S. Environmental Protection Agency. 1992. Procedures for Emission Inventory Preparation. Volume IV: Mobile Sources. (EPA-450/4-81-126d (revised)).
U.S. Environmental Protection Agency. 1993. Compilation of Air Pollutant Emission Factors. 4th Edition. Volume I, Supplement F. (AP-42).
U.S. Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors. 5th Edition. Volume I: Stationary Point and Area Sources. (AP-42).
U.S. Navy. 1990. Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines. (AESO Report No. 6-90).

This page intentionally left blank.

Appendix E. Noise

APPENDIX E
NOISE

E.1 NOISE MEASUREMENTS AND TERMINOLOGY

E.1.1 Introduction

Sound is caused by vibrations that generate waves of minute air pressure fluctuations in the air. Air pressure fluctuations that occur from 20 to 20,000 times per second can be detected as audible sound. The number of pressure fluctuations per second is normally reported as cycles per second or Hertz. Different vibrational frequencies produce different tonal qualities for the resulting sound.

Sound level meters typically report measurements as an overall decibel (dB) value. Decibel scales are a logarithmic index based on ratios between a measured value and a reference value. In the field of acoustics, decibel scales are based on ratios of the actual pressure fluctuations generated by sound waves compared to a standard reference pressure value of 20 micropascals.

Measurements and descriptions of sounds are usually based on various combinations of the following factors:

- the vibrational frequency characteristics of the sound, measured as sound wave cycles per second (Hertz); this determines the "pitch" of a sound;
- the total sound energy being radiated by a source, usually reported as a sound power level;
- the actual air pressure changes experienced at a particular location, usually measured as a sound pressure level; the frequency characteristics and sound pressure level combine to determine the "loudness" of a sound at a particular location;

- the duration of a sound; and
- the changes in frequency characteristics or pressure levels through time.

Modern sound level meters measure the actual air pressure fluctuations at a number of different frequency ranges, most often using octave or 1/3 octave intervals. The pressure measurements at each frequency interval are converted to a decibel index and adjusted for a selected frequency weighting system. The different adjusted decibel values for the octave or 1/3 octave bands are then combined into a composite sound pressure level for the appropriate decibel scale. Most sound level meters do not save or report the detailed frequency band pressure level measurements. A more sophisticated and expensive instrument (a spectrum analyzer) is required to obtain dB measurements for discrete frequency bands.

E.1.2 General Purpose Decibel Scales

Human hearing varies in sensitivity for different sound frequencies. The ear is most sensitive to sound frequencies between 800 and 8,000 Hertz, and is least sensitive to sound frequencies below 250 Hertz or above 16,000 Hertz. Consequently, several different frequency weighting schemes have been used to approximate the way the human ear responds to noise levels. The "A-weighted" decibel scale (dBA) is the most widely used for this purpose, with different dB adjustment values specified for each octave or 1/3 octave interval. The A-weighted scale significantly reduces the measured pressure level for low frequency sounds while slightly increasing the measured pressure level for some middle frequency sounds.

Other frequency weighting schemes are used for specialized purposes. The "C-weighted" decibel scale (dBC) is often used to characterize low frequency sounds capable of inducing vibrations in buildings or other structures. The C-weighted scale does not significantly reduce the measured pressure level for low frequency components of a sound.

Unweighted decibel measurements are frequently used for refined analyses that require data on the frequency spectrum of a sound (e.g., sound absorption or sound transmission properties of materials). Unweighted decibel measurements are sometimes termed flat or linear measurements or overall sound pressure levels.

Varying noise levels are often described in terms of the equivalent constant decibel level. Equivalent noise levels (Leq) are used to develop single-value descriptions of average noise exposure over various periods of time. Such average noise exposure ratings often include additional weighting factors for potential annoyance due to time of day or other considerations. The Leq data used for these average noise exposure descriptors are generally based on A-weighted sound level measurements.

Statistical descriptions (Lx, where x represents the percent of the time when noise levels exceed the specified decibel level) are also used to characterize noise conditions over specified periods of time. L1, L5, and L10 descriptors are commonly used to characterize peak noise levels, while L90, L95, and L99 descriptors are commonly used to characterize "background" noise levels. It should be noted that the L50 value (the sound level exceeded 50 percent of the time) will seldom be the same as the Leq value for the period being analyzed. The Leq value is often between the L30 and the L50 values for the measurement period.

E.1.3 Decibel Scales Reflecting Annoyance Potential

Average noise exposure over a 24-hour period is often presented as a day-night average sound level (Ldn). Ldn values are calculated from hourly Leq values, with the Leq values for the nighttime period (10 p.m. - 7 a.m.) increased by 10 dB to reflect the greater disturbance potential from nighttime noises.

The community noise equivalent level (CNEL) is also used to characterize average noise levels over a 24-hour period, with weighting factors for evening and nighttime noise levels. Leq values for the evening period (7 p.m. - 10 p.m.) are increased by 5 dB while Leq values for the nighttime period (10 p.m. - 7 a.m.) are increased by 10 dB. The CNEL value will be slightly higher than (but generally within 1 dB of) the Ldn value for the same set of noise measurements. Only in situations with high evening period noise levels will CNEL values be meaningfully different from Ldn values.

It should be noted that single-value average noise descriptors (such as Ldn or CNEL values) are most appropriately applied to variable but relatively continuous sources of noise. Typical urban noise conditions, highway traffic, and major commercial airports are examples where CNEL and Ldn descriptors are most appropriate.

E.1.4 Noise Descriptors for Discrete Noise Events

The annoyance potential of intermittent or short-duration noise events can be difficult to evaluate from 24-hour average noise descriptors. Railroad operations, aircraft activity at general aviation airports, testing of emergency generators, pile driving, and blasting activities sometimes require evaluations using other types of noise descriptors. Peak noise levels, the duration of individual noise events, and the repetition pattern of events are often used to describe intermittent or short duration noise conditions. Statistical descriptions (Lx values) and event-specific Leq values also can be used to characterize discrete noise events.

Impulse sounds usually are defined as noise events producing a significant increase in sound level but lasting less than two seconds (often less than one second). Examples of impulse noise sources include pile driving, punch presses, gunshots, fireworks, and blasting activities. Impulse noises are usually described using the sound exposure level (SEL) descriptor. The SEL measure represents the

cumulative (not average) sound exposure during a particular noise event, integrated with respect to a one-second time frame.

Individual noise events of greater duration sometimes are characterized using the single event noise exposure level (SENEL) descriptor. The SENEL of a noise event is calculated as the cumulative A-weighted sound exposure during a discrete noise event, integrated with respect to a one-second time frame.

Mathematically, the SEL and SENEL descriptors are the same (Peasons and Bennett 1974). SEL and SENEL measurements are equivalent to the Leq value of a one-second noise event producing the same cumulative acoustic energy as the actual noise event being analyzed. In effect, an SEL or SENEL measure "spreads" or "compresses" the noise event to fit a fixed one-second time interval. If the actual duration of the noise event is less than one second, the SEL or SENEL value will be less than the Leq value for the event. If the duration of the noise event exceeds one second, the SEL or SENEL value will exceed the Leq of the event.

In practice, the SENEL descriptor implies an A-weighted basis, while SEL descriptors often use other decibel weighting schemes. Impulse noises of substantial magnitude (e.g., blasting or sonic booms) often are characterized using unweighted (flat) or C-weighted SEL measures. Annoyance from such sources often involves induced structural vibrations as well as the loudness of the noise event. Unweighted and C-weighted decibel scales have proven more useful than the A-weighted scale for such evaluations. Less intense impulse noises often are characterized using an A-weighted SEL measure. In recent years, the SEL acronym has tended to replace the SENEL acronym in technical noise reports, regardless of the decibel weighting scheme being used.

Most SEL and SENEL measurements are performed using procedures that restrict the time interval over which actual measurements or subsequent calculations are made. Sometimes this involves defining the noise event as the period when sound levels exceed a particular threshold level. In other cases, the calculations are restricted to that portion of the noise event when sound levels are within a defined increment (generally 10 - 30 dB) of the peak sound level. The measurement restrictions noted above are done as a practical expediency to minimize manual computations, to accommodate monitoring instruments with a limited measurement range, or to systematically define discrete noise events against fluctuating background noise conditions.

If individual noise events are repeated frequently, it is possible to calculate Ldn or CNEL values based on typical SEL or SENEL values and the number and time of occurrence of the noise events. Such computation procedures often are used to evaluate airport noise.

E.2 NOISE IMPACT CALCULATIONS FOR FLYOVER EVENTS

E.2.1 Available Data

Most data on noise levels from military aircraft are presented as A-weighted SEL values at different slant distances from the flight path of an aircraft flying at low altitude. Noise monitoring is generally done for several power settings and air speeds. The reported SEL values are typically computed for the time interval when noise levels are within 10 dBA of the peak level. Data are available (US Navy 1984) for many, but not all, of the aircraft types used by the Navy. However, E-2 aircraft are not included in the available data compilation.

Although flyover event SEL data are not available for E-2 aircraft, data are available for the similar but larger P-3 aircraft. In terms of noise data, the most important difference between P-3 and E-2 aircraft is the number of engines. The P-3 aircraft has four engines while the E-2 aircraft has two. Both aircraft use the same basic engine type (Taylor, 1993). Thus, SEL data for P-3 aircraft can be used to estimate noise levels from E-2 aircraft.

E.2.2 Technical Approach

While SEL data have their uses, a dBA time history profile provides a more understandable description of flyover event noise. A dBA time history also allows peak noise levels to be estimated and compared to other common noise sources and various impact significance criteria.

Developing dBA time histories from SEL data requires some basic assumptions. A fundamental assumption is that aircraft SEL data provide a robust estimate of total acoustic energy output for basic engine power settings. When that assumption is used, it is possible to synthesize an approximate time history of dBA levels that is consistent with the measured SEL data.

The aircraft flyover event noise level analyses presented in this EIS required several steps: estimating flyover event durations, simulating flyover event time histories for a standardized slant distance, calibrating measured SEL data to a simple distance attenuation model, and estimating peak flyover event dBA at various slant distances.

Event Duration. The synthesis of dBA time histories from SEL data requires an estimate of the duration of the noise event that was measured for the SEL data. The SEL data tables (US Navy, 1984) indicate aircraft power setting, flight speed, and slant distance.

Preliminary analyses assume that aircraft can be heard above background noise from a distance of 2 nautical miles (2.3 statute miles). Flight speed then defines a nominal event duration. When flight speed is a significant fraction of the speed of sound, there will be only a brief time interval for the approach portion of the noise event (2 nautical miles at the speed of sound versus 2 nautical miles at flight

speed). Consequently, the duration of the approach segment of the noise event requires adjustment for the time lag between the speed of sound and the speed of the aircraft. Speed of sound calculations incorporate temperature and relative humidity corrections (Weast 1980).

Flyover profile simulation. The flyover event simulation analysis uses event durations and peak noise levels to create a time history using generalized noise level rise and fall equations. The simulation procedure used for this EIS divides the overall event into 25 intervals. Peak noise conditions are assumed to last for 2 intervals. The placement of the peak intervals depends on approach lag time versus overall event duration.

Noise level changes from background to peak and then back down to background are simulated with simple mathematical formulations. Different types of curves are used for the approach segment depending on the type of aircraft. For turboprop aircraft, a sine curve formulation is use to simulate the approach segment. A logarithmic curve formulation is used to simulate the departure segment of the event.

With the event duration defined and appropriate curve types programmed, the peak dBA value is the only remaining factor needed to fully define the event profile. Peak dBA values are identified by iteration, matching the simulated event SEL to the measured SEL value.

As noted previously, available aircraft SEL data were for the four-engine P-3 aircraft. Once the P-3 aircraft SEL data were simulated as a time history, E-2 aircraft peak dBA values were estimated as being 3 dBA less than the peak dBA for P-3 aircraft. This is consistent with general acoustical theory, in that doubling the number of co-located noise sources increases overall noise levels by 3 dBA.

For any basic power setting (takeoff, cruise, or approach power), the simulation can be repeated at various flight speeds. In each case, the SEL value used for calibration is assumed to be constant for a given power setting, regardless of air speed. Consequently, the only factors that vary are event duration (defined by air speed) and peak dBA (established by iteration and matching of the measured SEL value). Higher air speeds at a given power setting yield shorter event durations with higher peak dBA values.

Distance attenuation calibration. Measured SEL data at various slant distances (US Navy 1984) were also used to calibrate a basic two-factor noise attenuation model. The noise attenuation model calculates noise levels at various distances on the basis of a geometric noise drop-off rate and a linear atmospheric absorption rate. Measured SEL data at various distances were used to estimate basic drop-off rates and atmospheric absorption factors.

Modeled E-2 peak noise level versus distance. The final computation for the flyover event noise analysis applied the calibrated noise attenuation model to estimated peak dBA values for various E-2 power settings and air speeds.

Tables E-1 through E-21 summarize the results of the noise analysis.

E.3 REFERENCES

Pearsons, K. S. and R. Bennett. 1974. *Handbook of Noise Ratings.* Prepared for the National Aeronautics and Space Administration. (N74-23275.) National Technical Information Service. Springfield, VA. 326 pp.

Taylor, Michael J. H. (ed.). 1993. *Jane's Encyclopedia of Aviation.* Crescent Books. New York, NY.

US Navy. 1984. *Catalog of Noise Levels from Navy Aircraft.* AESO Report No. 313-01-84. Aircraft Environmental Support Office, Naval Air Station San Diego. San Diego, CA.

Weast, R. C. (ed.) 1980. "Absorption and Velocity of Sound in Still Air" and "Velocity of Sound in Dry Air". Pages E-49 through E-54 in *CRC Handbook of Chemistry and Physics.* 61st Edition. CRC Press. Boca Raton, FL.

TABLE E-1. FLYOVER EVENT DURATION CALCULATIONS: SEL TESTS FOR P3 & E2 AIRCRAFT

AIRCRAFT SPEED: 125 KNOTS = 144 MPH 18.7% of speed of sound
TYPICAL AIR TEMPERATURE: 70 DEGREES F TAKEOFF POWER
TYPICAL RELATIVE HUMIDITY: 60%

EVENT COMPONENT	APPROACH SEGMENT DISTANCE 1 NM	1.5 NM	2 NM	3 NM	4 NM
APPROACH LAG TIME (SECONDS), AIRCRAFT VS SOUND:	23.4	35.1	46.9	70.3	93.7
FLYOVER EVENT DURATION (SEC), 1 NM DEPARTURE:	52.2	63.9	75.7	99.1	122.5
FLYOVER EVENT DURATION (SEC), 1.5 NM DEPARTURE:	66.6	78.3	90.1	113.5	136.9
FLYOVER EVENT DURATION (SEC), 2 NM DEPARTURE:	81.0	92.7	104.5	127.9	151.3
FLYOVER EVENT DURATION (SEC), 3 NM DEPARTURE:	109.8	121.5	133.3	156.7	180.1
FLYOVER EVENT DURATION (SEC), 4 NM DEPARTURE:	138.6	150.3	162.1	185.5	208.9

AIRCRAFT SPEED & SEL DURATION REFERENCE POINTS:				1 NM	1.5 NM	2 NM	3 NM	4 NM
KNOTS	MPH	FT/SEC	SEC/MI	SEC/NM	S/1.5NM	SEC/2 NM	SEC/3 NM	SEC/4 NM
125	143.8	211.0	25.0	28.8	43.2	57.6	86.4	115.2
ESTIMATED SPEED OF SOUND:								
670.0	771.0	1130.8	4.7	5.4	8.1	10.7	16.1	21.5

NM = nautical miles
speed of sound (ft/sec) = [(deg R)^0.5]*49.042 + RH correction increment

deg R = 459.67+deg F
1.150779448 knots ⟹ mph

relative humidity corrections (68 F):

RH:	FT/SEC:	RH:	FT/SEC:
0%	0.00	50%	1.72
5%	0.03	55%	1.92
10%	0.19	60%	2.12
15%	0.36	65%	2.33
20%	0.54	70%	2.53
25%	0.73	75%	2.73
30%	0.92	80%	2.94
35%	1.12	85%	3.15
40%	1.31	90%	3.35
45%	1.51	95%	3.56
50%	1.72	100%	3.76

TABLE E-2. FLYOVER EVENT DURATION CALCULATIONS: SEL TESTS FOR P3 & E2 AIRCRAFT

AIRCRAFT SPEED: 150 KNOTS = 173 MPH 22.4% of speed of sound
TYPICAL AIR TEMPERATURE: 70 DEGREES F TAKEOFF POWER
TYPICAL RELATIVE HUMIDITY: 60%

EVENT COMPONENT	APPROACH SEGMENT DISTANCE 1 NM	1.5 NM	2 NM	3 NM	4 NM
APPROACH LAG TIME (SECONDS), AIRCRAFT VS SOUND:	18.6	27.9	37.3	55.9	74.5
FLYOVER EVENT DURATION (SEC), 1 NM DEPARTURE:	42.6	51.9	61.3	79.9	98.5
FLYOVER EVENT DURATION (SEC), 1.5 NM DEPARTURE:	54.6	63.9	73.3	91.9	110.5
FLYOVER EVENT DURATION (SEC), 2 NM DEPARTURE:	66.6	75.9	85.3	103.9	122.5
FLYOVER EVENT DURATION (SEC), 3 NM DEPARTURE:	90.6	99.9	109.3	127.9	146.5
FLYOVER EVENT DURATION (SEC), 4 NM DEPARTURE:	114.6	123.9	133.3	151.9	170.5

AIRCRAFT SPEED & SEL DURATION REFERENCE POINTS:				1 NM	1.5 NM	2 NM	3 NM	4 NM
KNOTS	MPH	FT/SEC	SEC/MI	SEC/NM	S/1.5NM	SEC/2 NM	SEC/3 NM	SEC/4 NM
150	172.6	253.2	20.9	24.0	36.0	48.0	72.0	96.0
ESTIMATED SPEED OF SOUND: 670.0	771.0	1130.8	4.7	5.4	8.1	10.7	16.1	21.5

NM = nautical miles
speed of sound (ft/sec) = [(deg R)^0.5]*49.042 + RH correction increment

deg R = 459.67+deg F
1.150779448 knots ==> mph

relative humidity corrections (68 F):

RH:	FT/SEC:	RH:	FT/SEC:
0%	0.00	50%	1.72
5%	0.03	55%	1.92
10%	0.19	60%	2.12
15%	0.36	65%	2.33
20%	0.54	70%	2.53
25%	0.73	75%	2.73
30%	0.92	80%	2.94
35%	1.12	85%	3.15
40%	1.31	90%	3.35
45%	1.51	95%	3.56
50%	1.72	100%	3.76

TABLE E-3. FLYOVER EVENT DURATION CALCULATIONS: SEL TESTS FOR P3 & E2 AIRCRAFT

AIRCRAFT SPEED: 160 KNOTS = 184 MPH 23.9% of speed of sound
TYPICAL AIR TEMPERATURE: 70 DEGREES F CRUISE POWER
TYPICAL RELATIVE HUMIDITY: 60%

EVENT COMPONENT	APPROACH SEGMENT DISTANCE 1 NM	1.5 NM	2 NM	3 NM	4 NM
APPROACH LAG TIME (SECONDS), AIRCRAFT VS SOUND:	17.1	25.7	34.3	51.4	68.5
FLYOVER EVENT DURATION (SEC), 1 NM DEPARTURE:	39.6	48.2	56.8	73.9	91.0
FLYOVER EVENT DURATION (SEC), 1.5 NM DEPARTURE:	50.9	59.4	68.0	85.1	102.3
FLYOVER EVENT DURATION (SEC), 2 NM DEPARTURE:	62.1	70.7	79.3	96.4	113.5
FLYOVER EVENT DURATION (SEC), 3 NM DEPARTURE:	84.6	93.2	101.8	118.9	136.0
FLYOVER EVENT DURATION (SEC), 4 NM DEPARTURE:	107.1	115.7	124.3	141.4	158.5

AIRCRAFT SPEED & SEL DURATION REFERENCE POINTS: KNOTS	MPH	FT/SEC	SEC/MI	SEC/NM	S/1.5NM	SEC/2 NM	SEC/3 NM	SEC/4 NM
160	184.1	270.0	19.6	22.5	33.8	45.0	67.5	90.0
ESTIMATED SPEED OF SOUND: 670.0	771.0	1130.8	4.7	5.4	8.1	10.7	16.1	21.5

NM = nautical miles
speed of sound (ft/sec) = [(deg R)^0.5]*49.042 + RH correction increment

deg R = 459.67+deg F
1.150779448 knots ⟹ mph

relative humidity corrections (68 F):

RH:	FT/SEC:	RH:	FT/SEC:
0%	0.00	50%	1.72
5%	0.03	55%	1.92
10%	0.19	60%	2.12
15%	0.36	65%	2.33
20%	0.54	70%	2.53
25%	0.73	75%	2.73
30%	0.92	80%	2.94
35%	1.12	85%	3.15
40%	1.31	90%	3.35
45%	1.51	95%	3.56
50%	1.72	100%	3.76

TABLE E-4. FLYOVER EVENT DURATION CALCULATIONS: SEL TESTS FOR P3 & E2 AIRCRAFT

AIRCRAFT SPEED: 200 KNOTS = 230 MPH 29.9% of speed of sound
TYPICAL AIR TEMPERATURE: 70 DEGREES F CRUISE POWER
TYPICAL RELATIVE HUMIDITY: 60%

EVENT COMPONENT	APPROACH SEGMENT DISTANCE 1 NM	1.5 NM	2 NM	3 NM	4 NM
APPROACH LAG TIME (SECONDS), AIRCRAFT VS SOUND:	12.6	18.9	25.3	37.9	50.5
FLYOVER EVENT DURATION (SEC), 1 NM DEPARTURE:	30.6	36.9	43.3	55.9	68.5
FLYOVER EVENT DURATION (SEC), 1.5 NM DEPARTURE:	39.6	45.9	52.3	64.9	77.5
FLYOVER EVENT DURATION (SEC), 2 NM DEPARTURE:	48.6	54.9	61.3	73.9	86.5
FLYOVER EVENT DURATION (SEC), 3 NM DEPARTURE:	66.6	72.9	79.3	91.9	104.5
FLYOVER EVENT DURATION (SEC), 4 NM DEPARTURE:	84.6	90.9	97.3	109.9	122.5

AIRCRAFT SPEED & SEL DURATION REFERENCE POINTS:				1 NM	1.5 NM	2 NM	3 NM	4 NM
KNOTS	MPH	FT/SEC	SEC/MI	SEC/NM	S/1.5NM	SEC/2 NM	SEC/3 NM	SEC/4 NM
200	230.2	337.6	15.6	18.0	27.0	36.0	54.0	72.0
ESTIMATED SPEED OF SOUND:								
670.0	771.0	1130.8	4.7	5.4	8.1	10.7	16.1	21.5

NM = nautical miles
speed of sound (ft/sec) = [(deg R)^0.5]*49.042 + RH correction increment

deg R = 459.67+deg F
1.150779448 knots ==> mph

relative humidity corrections (68 F):

RH:	FT/SEC:	RH:	FT/SEC:
0%	0.00	50%	1.72
5%	0.03	55%	1.92
10%	0.19	60%	2.12
15%	0.36	65%	2.33
20%	0.54	70%	2.53
25%	0.73	75%	2.73
30%	0.92	80%	2.94
35%	1.12	85%	3.15
40%	1.31	90%	3.35
45%	1.51	95%	3.56
50%	1.72	100%	3.76

TABLE E-5. FLYOVER EVENT DURATION CALCULATIONS: SEL TESTS FOR P3 & E2 AIRCRAFT

AIRCRAFT SPEED: 120 KNOTS = 138 MPH 17.9% of speed of sound
TYPICAL AIR TEMPERATURE: 70 DEGREES F APPROACH POWER
TYPICAL RELATIVE HUMIDITY: 60%

EVENT COMPONENT	APPROACH SEGMENT DISTANCE 1 NM	1.5 NM	2 NM	3 NM	4 NM
APPROACH LAG TIME (SECONDS), AIRCRAFT VS SOUND:	24.6	36.9	49.3	73.9	98.5
FLYOVER EVENT DURATION (SEC), 1 NM DEPARTURE:	54.6	66.9	79.3	103.9	128.5
FLYOVER EVENT DURATION (SEC), 1.5 NM DEPARTURE:	69.6	81.9	94.3	118.9	143.5
FLYOVER EVENT DURATION (SEC), 2 NM DEPARTURE:	84.6	96.9	109.3	133.9	158.5
FLYOVER EVENT DURATION (SEC), 3 NM DEPARTURE:	114.6	126.9	139.3	163.9	188.5
FLYOVER EVENT DURATION (SEC), 4 NM DEPARTURE:	144.6	156.9	169.3	193.9	218.5

AIRCRAFT SPEED & SEL DURATION REFERENCE POINTS:			1 NM	1.5 NM	2 NM	3 NM	4 NM
KNOTS	MPH	FT/SEC	SEC/MI	SEC/NM	S/1.5NM	SEC/2 NM	SEC/3 NM	SEC/4 NM
120	138.1	202.5	26.1	30.0	45.0	60.0	90.0	120.0
ESTIMATED SPEED OF SOUND:								
670.0	771.0	1130.8	4.7	5.4	8.1	10.7	16.1	21.5

NM = nautical miles
speed of sound (ft/sec) = [(deg R)^0.5]*49.042 + RH correction increment

deg R = 459.67+deg F
1.150779448 knots ==> mph

relative humidity corrections (68 F):

RH:	FT/SEC:	RH:	FT/SEC:
0%	0.00	50%	1.72
5%	0.03	55%	1.92
10%	0.19	60%	2.12
15%	0.36	65%	2.33
20%	0.54	70%	2.53
25%	0.73	75%	2.73
30%	0.92	80%	2.94
35%	1.12	85%	3.15
40%	1.31	90%	3.35
45%	1.51	95%	3.56
50%	1.72	100%	3.76

TABLE E-6. FLYOVER EVENT DURATION CALCULATIONS: SEL TESTS FOR P3 & E2 AIRCRAFT

AIRCRAFT SPEED: 130 KNOTS = 150 MPH 19.4% of speed of sound
TYPICAL AIR TEMPERATURE: 70 DEGREES F APPROACH POWER
TYPICAL RELATIVE HUMIDITY: 60%

EVENT COMPONENT	APPROACH SEGMENT DISTANCE 1 NM	1.5 NM	2 NM	3 NM	4 NM
APPROACH LAG TIME (SECONDS), AIRCRAFT VS SOUND:	22.3	33.5	44.6	67.0	89.3
FLYOVER EVENT DURATION (SEC), 1 NM DEPARTURE:	50.0	61.2	72.3	94.6	117.0
FLYOVER EVENT DURATION (SEC), 1.5 NM DEPARTURE:	63.9	75.0	86.2	108.5	130.8
FLYOVER EVENT DURATION (SEC), 2 NM DEPARTURE:	77.7	88.9	100.0	122.3	144.7
FLYOVER EVENT DURATION (SEC), 3 NM DEPARTURE:	105.4	116.6	127.7	150.0	172.4
FLYOVER EVENT DURATION (SEC), 4 NM DEPARTURE:	133.1	144.2	155.4	177.7	200.0

AIRCRAFT SPEED & SEL DURATION REFERENCE POINTS:				1 NM	1.5 NM	2 NM	3 NM	4 NM
KNOTS	MPH	FT/SEC	SEC/MI	SEC/NM	S/1.5NM	SEC/2 NM	SEC/3 NM	SEC/4 NM
130	149.6	219.4	24.1	27.7	41.5	55.4	83.1	110.8
ESTIMATED SPEED OF SOUND: 670.0	771.0	1130.8	4.7	5.4	8.1	10.7	16.1	21.5

NM = nautical miles
speed of sound (ft/sec) = [(deg R)^0.5]*49.042 + RH correction increment

deg R = 459.67+deg F
1.150779448 knots ==> mph

relative humidity corrections (68 F):

RH:	FT/SEC:	RH:	FT/SEC:
0%	0.00	50%	1.72
5%	0.03	55%	1.92
10%	0.19	60%	2.12
15%	0.36	65%	2.33
20%	0.54	70%	2.53
25%	0.73	75%	2.73
30%	0.92	80%	2.94
35%	1.12	85%	3.15
40%	1.31	90%	3.35
45%	1.51	95%	3.56
50%	1.72	100%	3.76

TABLE E-7. FLYOVER SIMULATION, E-2 TAKEOFF POWER AT 300 FEET AND 125 KNOTS

INPUT==>	PEAK dB =	84.54 dBA	315	FT SLANT DIST.
INPUT==>	EVENT DURATION =	104.50 seconds	144	MPH
INPUT==>	BACKGROUND dB =	50.00 dBA	125	KNOTS

ESTIMATED DECIBEL LEVEL	CALCS	DATA POINT SEQUENCE	INCREMENTAL dB CHANGE	INTERVAL COUNT	EVENT TIME (SECONDS)
50.00	100000	1	0.00	0	0.0
54.92	310138	2	4.92	1	4.2
59.73	939949	3	4.82	2	8.4
64.35	2721720	4	4.62	3	12.5
68.67	7368403	5	4.33	4	16.7
72.62	18276329	6	3.95	5	20.9
76.10	40771720	7	3.48	6	25.1
79.06	80480321	8	2.95	7	29.3
81.42	138633731	9	2.36	8	33.4
83.14	206105096	10	1.72	9	37.6
84.19	262327162	11	1.05	10	41.8
84.54	284446111	12	0.35	11	46.0
84.54	284446111	13	0.00	12	50.2
84.54	284446111	14	0.00	13	54.3
83.37	217296907	15	-1.17	14	58.5
82.10	162260560	16	-1.27	15	62.7
80.72	117936458	17	-1.39	16	66.9
79.19	82979083	18	-1.53	17	71.1
77.49	56100868	19	-1.70	18	75.2
75.57	36075531	20	-1.92	19	79.4
73.37	21742012	21	-2.20	20	83.6
70.80	12009231	22	-2.58	21	87.8
67.68	5861991	23	-3.11	22	92.0
63.74	2368562	24	-3.94	23	96.1
58.39	690961	25	-5.35	24	100.3
50.00	100000	26	-8.39	25	104.5

SEL =	99.71	dBA	P-3 DATA:	SEL delta10 = 102.6 dBA
Leq(event) =	79.52	dBA		at 125 knots, P-3 L(max) = 87.54 dBA
L(max) =	84.54	dBA	E-2 = P-3 L(max) - 3 dBA	
PEAK - SEL =	-15.17	dBA		
PEAK - Leq =	5.02	dBA	SIN CURVE	RISE
SEL - Leq =	20.19	dBA	LOG CURVE	DECAY
SEL delta10 =	99.74	dBA		

TABLE E-8. FLYOVER SIMULATION, E-2 TAKEOFF POWER AT 300 FEET AND 150 KNOTS

INPUT==>	PEAK dB =	85.47 dBA	315	FT SLANT DIST.
INPUT==>	EVENT DURATION =	85.30 seconds	173	MPH
INPUT==>	BACKGROUND dB =	50.00 dBA	150	KNOTS

ESTIMATED DECIBEL LEVEL	CALCS	DATA POINT SEQUENCE	INCREMENTAL dB CHANGE	INTERVAL COUNT	EVENT TIME (SECONDS)
50.00	100000	1	0.00	0	0.0
55.05	319735	2	5.05	1	3.4
59.99	998402	3	4.95	2	6.8
64.73	2974932	4	4.74	3	10.2
69.18	8272809	5	4.44	4	13.6
73.23	21027664	6	4.05	5	17.1
76.81	47934008	7	3.58	6	20.5
79.84	96366543	8	3.03	7	23.9
82.26	168447546	9	2.43	8	27.3
84.03	253117153	10	1.77	9	30.7
85.11	324262446	11	1.08	10	34.1
85.47	352370871	12	0.36	11	37.5
85.47	352370871	13	0.00	12	40.9
85.47	352370871	14	0.00	13	44.4
84.27	267242008	15	-1.20	14	47.8
82.97	197992587	16	-1.30	15	51.2
81.54	142676727	17	-1.42	16	54.6
79.98	99440374	18	-1.57	17	58.0
78.23	66525236	19	-1.75	18	61.4
76.26	42273330	20	-1.97	19	64.8
74.00	25132300	21	-2.26	20	68.2
71.36	13661764	22	-2.65	21	71.7
68.16	6541092	23	-3.20	22	75.1
64.11	2579249	24	-4.04	23	78.5
58.62	727874	25	-5.49	24	81.9
50.00	100000	26	-8.62	25	85.3

SEL =	99.70	dBA	P-3 DATA:	SEL delta10 = 102.6 dBA
Leq(event) =	80.39	dBA	at 150 knots, P-3 L(max) = 88.47 dBA	
L(max) =	85.47	dBA	E-2 = P-3 L(max) - 3 dBA	
PEAK - SEL =	-14.23	dBA		
PEAK - Leq =	5.08	dBA	SIN CURVE	RISE
SEL - Leq =	19.31	dBA	LOG CURVE	DECAY
SEL delta10 =	99.74	dBA		

TABLE E-9. FLYOVER SIMULATION, E-2 CRUISE POWER AT 300 FEET AND 160 KNOTS

INPUT==>	PEAK dB =	84.94 dBA	315	FT SLANT DIST.
INPUT==>	EVENT DURATION =	79.30 seconds	184	MPH
INPUT==>	BACKGROUND dB =	50.00 dBA	160	KNOTS

ESTIMATED DECIBEL LEVEL	CALCS	DATA POINT SEQUENCE	INCREMENTAL dB CHANGE	INTERVAL COUNT	EVENT TIME (SECONDS)
50.00	100000	1	0.00	0	0.0
55.47	352032	2	5.47	1	3.2
60.80	1201449	3	5.33	2	6.3
65.86	3856939	4	5.07	3	9.5
70.54	11316749	5	4.67	4	12.7
74.71	29555009	6	4.17	5	15.9
78.27	67097352	7	3.56	6	19.0
81.13	129770744	8	2.86	7	22.2
83.23	210373711	9	2.10	8	25.4
84.51	282476980	10	1.28	9	28.5
84.94	311888958	11	0.43	10	31.7
84.94	311888958	12	0.00	11	34.9
84.94	311888958	13	0.00	12	38.1
83.85	242735899	14	-1.09	13	41.2
82.68	185289026	15	-1.17	14	44.4
81.41	138272301	16	-1.27	15	47.6
80.02	100459416	17	-1.39	16	50.8
78.49	70675950	18	-1.53	17	53.9
76.79	47801841	19	-1.70	18	57.1
74.88	30774237	20	-1.91	19	60.3
72.69	18590854	21	-2.19	20	63.4
70.13	10313998	22	-2.56	21	66.6
67.05	5075508	23	-3.08	22	69.8
63.19	2083050	24	-3.87	23	73.0
57.98	628502	25	-5.20	24	76.1
50.00	100000	26	-7.98	25	79.3

SEL =	98.86	dBA	P-3 DATA:	SEL delta10 = 101.7 dBA
Leq(event) =	79.87	dBA	at 160 knots, P-3 L(max) = 87.94 dBA	
L(max) =	84.94	dBA	E-2 = P-3 L(max) - 3 dBA	
PEAK - SEL =	-13.92	dBA		
PEAK - Leq =	5.07	dBA	SIN CURVE	RISE
SEL - Leq =	18.99	dBA	LOG CURVE	DECAY
SEL delta10 =	98.83	dBA		

TABLE E-10. FLYOVER SIMULATION, E-2 CRUISE POWER AT 300 FEET AND 200 KNOTS

INPUT==>	PEAK dB =	86.11 dBA	315	FT SLANT DIST.
INPUT==>	EVENT DURATION =	61.30 seconds	230	MPH
INPUT==>	BACKGROUND dB =	50.00 dBA	200	KNOTS

ESTIMATED DECIBEL LEVEL	CALCS	DATA POINT SEQUENCE	INCREMENTAL dB CHANGE	INTERVAL COUNT	EVENT TIME (SECONDS)
50.00	100000	1	0.00	0	0.0
55.65	367185	2	5.65	1	2.5
61.16	1305751	3	5.51	2	4.9
66.39	4358727	4	5.23	3	7.4
71.22	13258444	5	4.83	4	9.8
75.53	35757125	6	4.31	5	12.3
79.21	83437324	7	3.68	6	14.7
82.17	164977439	8	2.96	7	17.2
84.34	271809781	9	2.17	8	19.6
85.67	368589193	10	1.32	9	22.1
86.11	408319386	11	0.44	10	24.5
86.11	408319386	12	0.00	11	27.0
86.11	408319386	13	0.00	12	29.4
84.98	315129113	14	-1.13	13	31.9
83.77	238383853	15	-1.21	14	34.3
82.46	176159380	16	-1.31	15	36.8
81.03	126623768	17	-1.43	16	39.2
79.45	88040458	18	-1.58	17	41.7
77.69	58771725	19	-1.76	18	44.1
75.72	37282641	20	-1.98	19	46.6
73.45	22145681	21	-2.26	20	49.0
70.81	12046159	22	-2.64	21	51.5
67.63	5788809	23	-3.18	22	53.9
63.63	2305991	24	-4.00	23	56.4
58.25	668404	25	-5.38	24	58.8
50.00	100000	26	-8.25	25	61.3

SEL =	98.85	dBA	P-3 DATA:	SEL delta10 = 101.7 dBA
Leq(event) =	80.97	dBA	at 200 knots, P-3 L(max) = 89.11 dBA	
L(max) =	86.11	dBA	E-2 = P-3 L(max) - 3 dBA	
PEAK - SEL =	-12.74	dBA		
PEAK - Leq =	5.14	dBA	SIN CURVE	RISE
SEL - Leq =	17.87	dBA	LOG CURVE	DECAY
SEL delta10 =	98.83	dBA		

TABLE E-11. FLYOVER SIMULATION, E-2 APPROACH POWER AT 300 FEET AND 120 KNOTS

INPUT==>	PEAK dB =	75.95 dBA	315	FT SLANT DIST.
INPUT==>	EVENT DURATION =	109.30 seconds	138	MPH
INPUT==>	BACKGROUND dB =	50.00 dBA	120	KNOTS

ESTIMATED DECIBEL LEVEL	CALCS	DATA POINT SEQUENCE	INCREMENTAL dB CHANGE	INTERVAL COUNT	EVENT TIME (SECONDS)
50.00	100000	1	0.00	0	0.0
53.69	234049	2	3.69	1	4.4
57.31	538389	3	3.62	2	8.7
60.78	1196746	4	3.47	3	13.1
64.03	2529082	5	3.25	4	17.5
66.99	5004534	6	2.96	5	21.9
69.61	9144714	7	2.62	6	26.2
71.83	15242385	8	2.22	7	30.6
73.60	22934804	9	1.77	8	35.0
74.90	30894720	10	1.29	9	39.3
75.69	37032808	11	0.79	10	43.7
75.95	39355008	12	0.26	11	48.1
75.95	39355008	13	0.00	12	52.5
75.95	39355008	14	0.00	13	56.8
75.07	32146804	15	-0.88	14	61.2
74.12	25813216	16	-0.95	15	65.6
73.08	20311309	17	-1.04	16	70.0
71.93	15596581	18	-1.15	17	74.3
70.65	11622743	19	-1.28	18	78.7
69.21	8341443	20	-1.44	19	83.1
67.56	5701904	21	-1.65	20	87.4
65.62	3650444	22	-1.94	21	91.8
63.28	2129793	23	-2.34	22	96.2
60.33	1078088	24	-2.96	23	100.6
56.31	427252	25	-4.02	24	104.9
50.00	100000	26	-6.31	25	109.3

SEL =	91.92	dBA	P-3 DATA:	SEL delta10 = 94.7 dBA
Leq(event) =	71.53	dBA	at 120 knots, P-3 L(max) = 78.95 dBA	
L(max) =	75.95	dBA	E-2 = P-3 L(max) - 3 dBA	
PEAK - SEL =	-15.97	dBA		
PEAK - Leq =	4.42	dBA	SIN CURVE	RISE
SEL - Leq =	20.39	dBA	LOG CURVE	DECAY
SEL delta10 =	91.88	dBA		

TABLE E-12. FLYOVER SIMULATION, E-2 APPROACH POWER AT 300 FEET AND 130 KNOTS

INPUT==>	PEAK dB =	76.36 dBA	315	FT SLANT DIST.
INPUT==>	EVENT DURATION =	100.00 seconds	150	MPH
INPUT==>	BACKGROUND dB =	50.00 dBA	130	KNOTS

ESTIMATED DECIBEL LEVEL	CALCS	DATA POINT SEQUENCE	INCREMENTAL dB CHANGE	INTERVAL COUNT	EVENT TIME (SECONDS)
50.00	100000	1	0.00	0	0.0
53.75	237215	2	3.75	1	4.0
57.43	552901	3	3.68	2	8.0
60.95	1244612	4	3.52	3	12.0
64.25	2661517	5	3.30	4	16.0
67.26	5323692	6	3.01	5	20.0
69.92	9821004	7	2.66	6	24.0
72.18	16502294	8	2.25	7	28.0
73.98	24991363	9	1.80	8	32.0
75.29	33823884	10	1.31	9	36.0
76.09	40660182	11	0.80	10	40.0
76.36	43251383	12	0.27	11	44.0
76.36	43251383	13	0.00	12	48.0
76.36	43251383	14	0.00	13	52.0
75.47	35216777	15	-0.89	14	56.0
74.50	28180474	16	-0.97	15	60.0
73.44	22090182	17	-1.06	16	64.0
72.28	16891897	18	-1.17	17	68.0
70.98	12529673	19	-1.30	18	72.0
69.52	8945323	20	-1.46	19	76.0
67.84	6078051	21	-1.68	20	80.0
65.87	3863938	22	-1.97	21	84.0
63.49	2235242	23	-2.38	22	88.0
60.49	1119360	24	-3.00	23	92.0
56.41	437168	25	-4.08	24	96.0
50.00	100000	26	-6.41	25	100.0

SEL =	91.91	dBA	P-3 DATA:	SEL delta10 = 94.7 dBA
Leq(event) =	71.91	dBA	at 130 knots, P-3 L(max) = 79.36 dBA	
L(max) =	76.36	dBA	E-2 = P-3 L(max) - 3 dBA	
PEAK - SEL =	-15.55	dBA		
PEAK - Leq =	4.45	dBA	SIN CURVE	RISE
SEL - Leq =	20.00	dBA	LOG CURVE	DECAY
SEL delta10 =	91.88	dBA		

TABLE E-13. DISTANCE CALIBRATION FOR P-3 SEL DATA, TAKEOFF POWER

==> Basic sound level drop-off rate:		5.25 dB/doubling
==> Atmospheric absorption coefficient:		0.08 dB/100 meters
==> Reference Noise Level:		102.6 SEL (dBA)
==> Distance for Reference Noise Level:		315 Feet
deviation 200-8,000 ft:	1.33	
deviation 10,000-25,000 ft:	-0.06	

DISTANCE ATTENUATION:

Receptor Distance (feet)	Noise Level (dBA) at Receptor	Target SEL
200	106.1	105.8
250	104.4	104.2
315	102.6	102.6
400	100.8	100.9
500	99.1	99.2
630	97.3	97.4
800	95.4	95.6
1,000	93.7	93.8
1,250	91.9	91.9
1,600	90.0	90.0
2,000	88.2	88.1
2,500	86.4	86.2
3,150	84.5	84.2
4,000	82.5	82.3
5,000	80.5	80.0
6,300	78.5	78.2
8,000	76.2	76.1
10,000	74.0	73.9
12,500	71.7	71.6
16,000	69.0	69.1
20,000	66.4	66.5
25,000	63.5	63.6

DISTANCE TO dB CONTOURS:

Noise Contour Value (dBA)	Contour Distance (feet)
105	230
100	442
95	843
90	1,596
85	2,996
80	5,211
75	8,650
70	29,455
65	50,038
60	70,578
55	91,104
50	95,655
45	100,433
40	105,450
35	110,718
30	116,249
25	121,936

TABLE E-14. DISTANCE CALIBRATION FOR P-3 SEL DATA, CRUISE POWER

==> Basic sound level drop-off rate:		5.4 dB/doubling
==> Atmospheric absorption coefficient:		0.11 dB/100 meters
==> Reference Noise Level:		101.7 SEL (dBA)
==> Distance for Reference Noise Level:		315 Feet
deviation 200-8,000 ft:	2.46	
deviation 10,000-25,000 ft:	0.80	

DISTANCE ATTENUATION:

Receptor Distance (feet)	Noise Level (dBA) at Receptor	Target SEL
200	105.3	104.9
250	103.5	103.3
315	101.7	101.7
400	99.8	100.0
500	98.0	98.3
630	96.2	96.5
800	94.3	94.6
1,000	92.5	92.7
1,250	90.6	90.8
1,600	88.6	88.7
2,000	86.7	86.7
2,500	84.8	84.2
3,150	82.8	82.4
4,000	80.7	80.2
5,000	78.6	78.0
6,300	76.4	75.7
8,000	73.9	73.3
10,000	71.5	70.9
12,500	68.9	68.4
16,000	65.8	65.7
20,000	62.8	62.8
25,000	59.3	59.8

DISTANCE TO dB CONTOURS:

Noise Contour Value (dBA)	Contour Distance (feet)
105	207
100	391
95	735
90	1,342
85	2,461
80	4,207
75	7,559
70	22,315
65	37,179
60	52,068
55	66,967
50	70,207
45	73,603
40	77,164
35	80,896
30	84,810
25	88,808

TABLE E-15. DISTANCE CALIBRATION FOR P-3 SEL DATA, APPROACH POWER

==> Basic sound level drop-off rate:	4.89 dB/doubling
==> Atmospheric absorption coefficient:	0.06 dB/100 meters
==> Reference Noise Level:	94.7 SEL (dBA)
==> Distance for Reference Noise Level:	315 Feet
deviation 200-8,000 ft:	-0.55
deviation 10,000-25,000 ft:	2.00

DISTANCE ATTENUATION:

Receptor Distance (feet)	Noise Level (dBA) at Receptor	Target SEL
200	97.9	97.7
250	96.3	96.2
315	94.7	94.7
400	93.0	93.1
500	91.4	91.5
630	89.8	89.9
800	88.0	88.3
1,000	86.4	86.7
1,250	84.8	85.0
1,600	83.0	83.3
2,000	81.4	81.5
2,500	79.7	79.8
3,150	77.9	77.9
4,000	76.1	76.1
5,000	74.3	74.2
6,300	72.5	72.2
8,000	70.5	70.2
10,000	68.5	68.2
12,500	66.5	66.1
16,000	64.1	63.8
20,000	61.8	61.4
25,000	59.3	58.8

DISTANCE TO dB CONTOURS:

Noise Contour Value (dBA)	Contour Distance (feet)
105	74
100	149
95	302
90	609
85	1,219
80	2,412
75	4,703
70	8,294
65	35,825
60	63,209
55	90,569
50	117,920
45	123,965
40	130,320
35	137,000
30	144,023
25	151,310

TABLE E-16. MODELED NOISE LEVELS: E-2, TAKEOFF AT 125 KNOTS

==> Basic sound level drop-off rate: 5.25 dB/doubling
==> Atmospheric absorption coefficient: 0.08 dB/100 meters
==> Reference Level (SEL, Lmax, Leq): 84.54 Lmax dBA
==> Distance for Reference Noise Level: 315 Feet

DISTANCE ATTENUATION:

Receptor Distance (feet)	Lmax Value (dBA) at Receptor
50	98.5
100	93.3
300	84.9
361	83.5
539	80.4
583	79.8
707	78.3
808	77.3
901	76.4
1,020	75.5
1,513	72.4
2,002	70.1
2,502	68.3
3,002	66.8
5,000	62.5
7,500	58.8
10,560	55.4

DISTANCE TO dB CONTOURS:

Lmax Noise Contour Value (dBA)	Contour Distance (feet)
105	21
100	41
95	80
90	154
85	297
80	569
75	1,079
70	2,028
65	3,571
60	6,920
55	10,815
50	31,407
45	51,938
40	72,456
35	92,968
30	97,490
25	102,200

TABLE E-17. MODELED NOISE LEVELS: E-2, TAKEOFF AT 150 KNOTS

==> Basic sound level drop-off rate: 5.25 dB/doubling
==> Atmospheric absorption coefficient: 0.08 dB/100 meters
==> Reference Level (SEL, Lmax, Leq): 85.47 Lmax dBA
==> Distance for Reference Noise Level: 315 Feet

DISTANCE ATTENUATION:

Receptor Distance (feet)	Lmax Value (dBA) at Receptor
50	99.5
100	94.2
300	85.8
361	84.4
539	81.3
583	80.7
707	79.3
808	78.2
901	77.4
1,020	76.4
1,513	73.3
2,002	71.1
2,502	69.2
3,002	67.7
5,000	63.4
7,500	59.7
10,560	56.4

DISTANCE TO dB CONTOURS:

Lmax Noise Contour Value (dBA)	Contour Distance (feet)
105	24
100	47
95	90
90	174
85	335
80	641
75	1,207
70	2,317
65	4,397
60	7,357
55	11,375
50	32,143
45	52,725
40	73,267
35	93,793
30	98,355
25	103,104

TABLE E-18. MODELED NOISE LEVELS: E-2, CRUISE AT 160 KNOTS

==> Basic sound level drop-off rate: 5.40 dB/doubling
==> Atmospheric absorption coefficient: 0.11 dB/100 meters
==> Reference Level (SEL, Lmax, Leq): 84.94 Lmax dBA
==> Distance for Reference Noise Level: 315 Feet

DISTANCE ATTENUATION:

Receptor Distance (feet)	Lmax Value (dBA) at Receptor
50	99.4
100	94.0
300	85.3
361	83.9
539	80.7
583	80.1
707	78.5
808	77.4
901	76.6
1,020	75.5
1,513	72.3
2,002	70.0
2,502	68.1
3,002	66.5
5,000	61.8
7,500	57.8
10,560	54.1

DISTANCE TO dB CONTOURS:

Lmax Noise Contour Value (dBA)	Contour Distance (feet)
105	24
100	46
95	87
90	166
85	313
80	587
75	1,086
70	1,996
65	3,405
60	5,668
55	10,169
50	24,986
45	39,866
40	54,762
35	69,664
30	72,917
25	76,295

TABLE E-19. MODELED NOISE LEVELS: E-2, CRUISE AT 200 KNOTS

==> Basic sound level drop-off rate: 5.40 dB/doubling
==> Atmospheric absorption coefficient: 0.11 dB/100 meters
==> Reference Level (SEL, Lmax, Leq): 86.11 Lmax dBA
==> Distance for Reference Noise Level: 315 Feet

DISTANCE ATTENUATION:

Receptor Distance (feet)	Lmax Value (dBA) at Receptor
50	100.5
100	95.1
300	86.5
361	85.0
539	81.9
583	81.2
707	79.7
808	78.6
901	77.7
1,020	76.7
1,513	73.5
2,002	71.1
2,502	69.2
3,002	67.6
5,000	63.0
7,500	59.0
10,560	55.3

DISTANCE TO dB CONTOURS:

Lmax Noise Contour Value (dBA)	Contour Distance (feet)
105	28
100	54
95	102
90	191
85	363
80	680
75	1,290
70	2,333
65	4,361
60	7,102
55	10,706
50	25,653
45	40,577
40	55,496
35	70,412
30	73,700
25	77,111

TABLE E-20. MODELED NOISE LEVELS: E-2, APPROACH AT 120 KNOTS

==> Basic sound level drop-off rate:	4.89 dB/doubling
==> Atmospheric absorption coefficient:	0.06 dB/100 meters
==> Reference Level (SEL, Lmax, Leq):	75.95 Lmax dBA
==> Distance for Reference Noise Level:	315 Feet

DISTANCE ATTENUATION:

Receptor Distance (feet)	Lmax Value (dBA) at Receptor
50	89.0
100	84.1
300	76.3
361	75.0
539	72.1
583	71.6
707	70.2
808	69.2
901	68.4
1,020	67.5
1,513	64.7
2,002	62.6
2,502	60.9
3,002	59.6
5,000	55.6
7,500	52.3
10,560	49.3

DISTANCE TO dB CONTOURS:

Lmax Noise Contour Value (dBA)	Contour Distance (feet)
105	5
100	11
95	21
90	43
85	88
80	177
75	360
70	724
65	1,450
60	2,860
55	5,281
50	10,083
45	37,186
40	64,464
35	91,776
30	119,099
25	125,067

TABLE E-21. MODELED NOISE LEVELS: E-2, APPROACH AT 130 KNOTS

==>	Basic sound level drop-off rate:	4.89 dB/doubling
==>	Atmospheric absorption coefficient:	0.06 dB/100 meters
==>	Reference Level (SEL, Lmax, Leq):	76.36 Lmax dBA
==>	Distance for Reference Noise Level:	315 Feet

DISTANCE ATTENUATION:

Receptor Distance (feet)	Lmax Value (dBA) at Receptor
50	89.4
100	84.5
300	76.7
361	75.4
539	72.5
583	72.0
707	70.6
808	69.6
901	68.8
1,020	67.9
1,513	65.1
2,002	63.0
2,502	61.3
3,002	60.0
5,000	56.0
7,500	52.7
10,560	49.7

DISTANCE TO dB CONTOURS:

Lmax Noise Contour Value (dBA)	Contour Distance (feet)
105	6
100	11
95	23
90	46
85	93
80	188
75	381
70	768
65	1,526
60	2,990
55	5,486
50	10,359
45	37,602
40	64,917
35	92,245
30	119,579
25	125,569

Appendix F. Cultural Resources

APPENDIX F
CULTURAL RESOURCES

F.1 PREFERRED ALTERNATIVE: NAWS POINT MUGU

Prehistory

Prehistoric occupation of the region encompassing Point Mugu began at least 3,000 years before present (BP). Two distinct cultural assemblages have been identified for this occupation: the Intermediate Period and the Late Prehistoric Chumash Period. During the Intermediate Period (3,000 to 1,000 years BP), milling activities were common; however, greater emphasis was placed on hunting. Exploitation of marine resources also occurred. Acorns and shellfish were a staple (Grant 1978a,b; Moratto 1984).

The Late Prehistoric Chumash Period (1,000 to 100 years BP) is characterized by a highly developed maritime economy. Subsistence practices focused on hunting marine and land mammals and fishing. Rabbits and squirrels were hunted in greater numbers than in previous times. Shellfish were also exploited, and local plants were consumed. Trade with inland groups also increased during this period and beads took on more of an economical value for exchange, rather than simply an ornamental value as had been the standard (Grant 1978a,b; Moratto 1984).

Ethnohistory

The primary Native American group to occupy the coastal territory encompassing NAWS Point Mugu was the Ventureño Chumash. The Ventureño Chumash territory was mainly mountainous, except for the Oxnard Plain between Ventura and Point Mugu. The northern extent of their territory encompassed the headwaters of the Ventura and Santa Clara rivers (Grant 1978b).

Chumash resided in villages or rancherias comprised of patrilinial descendant groups. Villages were large with populations up to 1,000, although smaller groups dispersed in the spring and summer to locations of available resources. A typical

Chumash village included several houses, a sweathouse, store houses, a ceremonial enclosure, and a cemetery located away from the living area (Grant 1978b).

Subsistence practices utilized both marine and terrestrial food resources. Acorns and piñon nuts were a staple. Other harvested plants included bulbs, berries, chia sage, and seeds. Mule deer, coyote, fox, rabbits, and game birds were hunted. From canoes, seals, sea otters, porpoises, shark, and large fish were harpooned. Smaller fish were captured with seines and dip nets. Mollusks, clams, and abalone were consumed in great numbers (Grant 1978b).

Although the Ventureño Chumash territory was visited by Juan Rodríquez Cabrillo in 1542, the group did not experience any real effects of European presence in the area until the late 1700s. In 1772, the San Luis Obispo Mission became the first Franciscan mission in Chumash territory. It was soon followed by the San Buenaventura, Santa Barbara, La Purísima Concepción, and Santa Ynez missions. By the early 1800s, the majority of the Chumash had been forced onto the missions. The remainder fled into the mountains and inland valleys. Within the missions, Chumash populations rapidly dwindled. Many perished from introduced diseases. Following secularization of the missions in the 1830s, the Chumash were exploited as cheap labor by first Mexican, and later Anglo-American settlers. These events all had a drastic effect on the Chumash population. The entire Chumash population in 1770 has been estimated between 8,000 and 17,000. By 1920, it was estimated at less than 100. In 1972, approximately 40 Chumash of various bands resided on the Zanja de Cota reserve near the Santa Ynez mission. Many more are believed to be scattered throughout southern California, but with little knowledge of their traditional culture (Grant 1978a,b). In 1990, the Santa Ynez Band of Mission Indians had a population of 340 Chumash. The population figures for the Coastal Band and Santa Barbara Band of Chumash Indians are not available (National Native American Cooperative 1996).

History

The Point Mugu area was first encountered by European explorers during the expedition of Juan Rodríquez Cabrillo in 1542. Cabrillo named the area "Mugu" after a Chumash word meaning beach. However, Spanish settlement along the California coast did not occur until the 1770s when Franciscans began to establish missions. The San Buenaventura Mission, established in 1782, was the closest in proximity to Point Mugu, located approximately 15 miles northwest of Mugu Lagoon. The Spanish relocated the native populations to the mission, and introduced wheat as the primary agricultural crop and raised cattle (Swanson 1994).

In 1821, when Mexico obtained independence and control of California from Spain, the large mission holdings were divided and given away as land grants. Two Mexican ranchos, based on these land grants, were established in the Point Mugu area: Rancho El Rio de Santa Clara o La Colonia and Rancho Guadalasca. Although the rancho boundaries were not well defined, Mugu Lagoon appears to

have been near the border of Rancho El Rio while the majority of it was considered part of Rancho Guadalasca, awarded to Ysabel Yorba in 1836. In her petition for the land, Yorba claimed that she intended to raise cattle on the land to support herself (Swanson 1994).

Following the annexation of California into the United States in 1845, existing land claims were challenged and the Mexican rancho system of land ownership was eventually dissolved. Ysabel Yorba sold several parcels of the Rancho Guadalasca between 1870 and her death in 1873. Following her death, the remainder of the rancho was subdivided and sold to American settlers and businessmen. In 1880, William Broome purchased over 22,000 acres of the rancho and kept the original name for the rancho. Starting in 1864, Thomas Scott, vice-president of the Pennsylvania Railroad, began to buy portions of Rancho El Rio de Santa Clara o La Colonia for the purpose of oil speculation. By the late 1860s, Thomas Bard held the entire rancho in trust for Scott along with an additional 200,000 acres of land in Ventura County. As oil ventures failed, Bard sold or leased parcels of the land to American settlers who recognized the value of the land for agricultural pursuits. Other parcels were lost to homesteaders in disputes over the rancho boundaries. In 1871 and 1872, Bard constructed a wharf and laid out a town at Hueneme. The wharf , and later the railroad, aided the development of local agriculture, which in the 1880s was primarily barley, corn, flax, and wheat (Swanson 1994).

In the mid-1890s through the early years of 20th Century, lima beans and sugar beets were the top agricultural product in Ventura County, with the city of Oxnard growing around the American Sugar Beet Company established by the Oxnard brothers on the plain north of Hueneme. However, while much of the land in Ventura County was devoted to agricultural pursuits, Calleguas Creek and Mugu Lagoon were relatively pristine due to the marshy nature of the land. This slowly changed in the 1920s and 1930s as recreational use of the area increased. Recreational development was possible due to the partition by the Broom family of Rancho Guadalasca, which encompassed the lagoon, and the creation of a coastal highway that linked Ventura County beaches with the Los Angeles area. These developments opened Mugu Lagoon to hunting and fishing enthusiasts. Hunting clubs, such as the Point Mugu Game Preserve, the Ventura County Game Preserve, and the Mugu Fish Camp were expanded near the inlet of Mugu Lagoon. Mugu Lagoon was also the backdrop for several films produced by the movie industry during this time (Swanson 1994).

With the outbreak of World War II, the area around Mugu Lagoon served as a training areas for Seabees stationed at the Construction Battalion Center, Port Hueneme. The Navy negotiated leases for the land with local landowners. A military contingent was also stationed at the Mugu Fish Camp, and a military camp was created by the Acorn Assembly and Training Detachment around Mugu Lagoon. The first runway was built north of the lagoon (Swanson 1994).

The establishment of a formal military base at Point Mugu was authorized by Congress in 1946. Funding was approved in 1948 for the Point Mugu Naval Reservation (Swanson 1994). About this time, the mouth of Calleguas Creek was dredged and the spoil was used as fill for military facilities and new runways. Approximately 1,000 acres (405 hectares) of the base's original surface was buried by three to 12 feet (one to four meters) of new soil (Swanson 1994; Schwartz 1991).

NAWS Point Mugu was originally established in the 1940s as a training facility for the Acorn Training Detachment to train personnel in the construction of small air bases on islands in the Pacific. With the end of World War II, naval training activities ceased at Point Mugu and the installation soon became the Naval Air Missile Test Center, with construction of permanent facilities beginning in 1948. In the 1950s, a new national emphasis was placed on ballistic missiles and space-based programs. As a result, several national missile ranges were created including the Navy's Pacific Missile Range at Point Mugu. Test and evaluation of missile systems continued at Point Mugu during the 1960s and 1970s. During the Vietnam conflict, surface-to-surface, surface-to-air, and air-to-surface missiles were tested primarily at Point Mugu, China Lake, White Sands, and Cape Canaveral. Following this, missile testing by the Navy slowed until President Reagan began a dramatic build up of the military in the 1980s in response to events in Iran and Afghanistan. New naval missile systems were tested at the four primary facilities, including Point Mugu, and consisted of the Trident, Harpoon, Tomahawk, and Aegis systems. With the end of the Cold War came another cut in military spending. In 1990, a plan was developed to streamline the Navy's guided missile research, development, and testing operations. Activities at China Lake, White Sands, and Point Mugu were consolidated into a single organization. In 1992, the Naval Air Warfare Center (NAWC) was established with China Lake as the primary site for research and development, and Point Mugu the primary facility for guided missile test and evaluation (Wee and Byrd 1997). The primary mission of Point Mugu today remains the testing and evaluation of guided missiles.

F.2 NAS Lemoore Alternative

Prehistory

NAS Lemoore is located in the San Joaquin Valley. It is generally believed that human occupation of the San Joaquin Valley dates back to at least 10,000 years before present (BP). A minimum of one site in the valley is thought to have been occupied between 40,000 to 200,000 years BP; however, the reliability of the dating techniques used and the validity of the association of human remains with extinct fauna remains found within the site remains highly controversial. The lifeways of any inhabitants of California during the Pleistocene Epoch (pre-10,000 years BP) is largely unknown. A hunting/gathering strategy has been theorized; however, direct evidence of plant use is lacking and there are few documented relationships between tools and extinct faunal remains. No milling-related artifacts

have been found within sites dating to this period. Use of wood, bone, and stone tools is thought to have occurred (Moratto 1984).

Archaeological evidence for occupation of California during the Holocene Epoch (10,000 years BP to present) is stronger. Early Holocene Period (10,000 to 8,000 years BP) sites are common throughout California. Hunter/gatherers were attracted to lacustrine and marshland settings for the varied and abundant resources found there. Milling-related artifacts are lacking during this period but the atlatl and dart are common. Heat-treating of lithic materials for tool manufacture is also evident. Hunting of large and small game occurred, as well as fishing. Limited permanent settlements may have been established near large water sources, but a nomadic lifestyle was more common (Moratto 1984).

Milling of plant materials may have commenced later in the Holocene Epoch. Milling-related artifacts first appear in sites dating to the Early Horizon Period (8,000 to 4,000 years BP), but occur infrequently on these sites. Hunting and gathering continued during this period, especially of large game, but with greater reliance on vegetal foods. Mussels and oysters were also a staple. Greater consumption of shellfish and increased milling activities occurred in the Middle Horizon Period (4,000 to 2,000 years BP). Use of bone artifacts increased and baked-earth steaming ovens were developed. Occupation of permanent or semi-permanent villages and reoccupation of seasonal sites was common in this period. During the Late Horizon Period (2,000 years BP to European Contact), subsistence activities became greatly diversified, exploiting a wide variety of resources. The mixed economy of this period emphasized fishing; hunting waterfowl; and collecting shellfish, roots, and seeds. Settlement of villages also increased, as did trade between different groups (Wallace 1978; Moratto 1984). During this time, regional subcultures developed, each with their own geographical territory and language or dialect.

Ethnohistory

The primary Native American group known to have utilized the southern San Joaquin Valley is the Southern Valley Yokuts. The Southern Valley Yokuts, geographically and linguistically distinguished from the neighboring Northern Valley and Foothill Yokuts, were divided into 15 distinct tribes, each speaking a separate dialect of the Yokuts language and controlling a separate territory of approximately 250 square miles (648 square kilometers). The territory encompassing the present-day NAS Lemoore was occupied by the Tachi tribe. Each Southern Valley Yokuts tribe is estimated to have included approximately 350 people. Some tribes included only a single village, but more often several settlements comprised one tribe. Villages were occupied nearly year-round, with families leaving for a few months to gather seeds and other wild plants in the spring or summer. During these times, dispersed camps were occupied near the shifting resources (Kroeber 1925; Wallace 1978).

Several tribes, including the Tachi, built single-family dwellings as well as long, steep-roofed communal residences that sheltered 10 or more families. Each settlement also had one communal sweathouse (Wallace 1978).

Subsistence practices of the Southern Valley Yokuts emphasized fishing; hunting waterfowl; and collecting shellfish, roots, and seeds. Antelope and elk were hunted from the lake shores. Wild pigeons, rabbits, and squirrels were also consumed. Large quantities of mussels were gathered, and turtles were commonly eaten. Tule roots and seeds were a staple. Although acorns were not readily available in their territory, Tachi members traveled to neighboring territories to trade fish for acorns (Wallace 1978).

The aboriginal population of the Southern Valley Yokuts has been estimated at between 5,250 and 15,700. Although contact with Europeans first occurred in the 1770s, the Southern Valley Yokuts were not drastically affected until settlement of the valley by Americans in the mid-1800s. Many Southern Valley Yokuts eventually settled in the Tule River Reservation, while a separate Tachi settlement was established near Lemoore. In the early 1970s, 100 members of the Tachi tribe lived on the Santa Rosa Reservation near Lemoore, while 325 Yokuts lived on the Tule River Reservation (Wallace 1978).

History

In 1772, Pedro Fages passed through the Southern San Joaquin Valley en route to San Luis Obispo. Four years later, Francisco Garces, a Franciscan friar, visited the area and kept a detailed journal of his journey. Active explorations began in 1802 with the second administration of Governor Jose Arrillaga, who was eager to gain a foothold in the interior. Several expeditions occurred, beginning in 1806. During the period in which California was ruled by Mexico (1822-1846), no rancheros were established within the southern San Joaquin Valley, and Mexican influence on the Southern Yokuts was minimal (Gallegos and Associates 1997b).

Following the annexation of California by the United States in 1845, the San Joaquin Valley was quickly occupied by settlers. The first community was Visalia founded in 1852. The cities of Hanford and Lemoore were founded circa 1877 when the Southern Pacific Railroad was extended westward from the town of Goshen. By 1891, Lemoore was the largest wool shipping point in California (Gallegos and Associates 1997b).

NAS Lemoore was established in 1957 when the US Navy acquired over 18,000 acres (7,290 hectares) of agricultural land for station operations. At that time, existing farm houses and outbuildings were razed (US Navy 1994d). The primary mission at NAS Lemoore includes a rapid response force of jet fighter and ground support aircraft to meet aggressor actions. The base was commissioned in 1961 and began operations during the height of the Cold War (US Navy 1994d).

F.3 NAF El Centro Alternative

Prehistory

NAF El Centro is located in the Colorado Desert Region. The prehistory of the Colorado Desert region includes three major periods of occupation: the Paleoindian Period (12,000 to 7,000 years BP), the Archaic Period (7,000 to 1,200 years BP), and the Patayan Period (1,200 years BP to European Contact). An earlier occupation has been suggested, but there is little evidence to support the claim. The Paleoindian Period is commonly known as the San Dieguito Complex. The San Dieguito populations were mobile hunter-gatherers whose seasonal rounds covered large territories. Sites of this period are frequently located on terraces overlooking major washes and extinct lake shores. In subsequent phases within this period, lithic tools become smaller and more sophisticated. Milling-related tools are absent (Moratto 1984; Apple *et al.* 1994).

During the Archaic Period, hunting and gathering continue, but with greater regional specialization. Sites of this period indicate an adaptation to the drier and warmer climate of the Holocene Epoch. Lithic tools and milling-related artifacts are common. The region encompassing NAF El Centro, however, includes a relative lack of sites dating to this period. This has led to debates over the possible abandonment of the area during this time (Moratto 1984; Apple *et al.* 1994).

The Patayan Period is characterized by the appearance of pottery and floodplain agriculture. During this period, small mobile groups occupied seasonal settlements along the Colorado floodplain. This period encompasses the appearance and disappearance of Lake Cahuilla (approximately 1,000 to 350 years BP, respectively). The now extinct lake is thought to have attracted people from the Colorado River who introduced new technology and pottery (Moratto 1984; Apple *et al.* 1994).

Ethnohistory

The region encompassing the present-day NAF El Centro was occupied prehistorically by the Kumeyaay. Kumeyaay territory included the coastal shore from San Diego to Ensenada, Mexico, and east as far as the Chocolate Mountains. Kumeyaay were loosely organized into bands or autonomous tribelets. Each band controlled a portion of land with boundaries identified by natural landmarks. Communal claims were made to all springs and food resources within that land and boundaries were protected against trespassers. Permanent settlements were rare. Instead, campsites were seasonally reoccupied within a band's territory. Occasionally several bands wintered together in one location but dispersed in the spring. Ceremonial structures were also built within villages; however, sweathouses were not common (Luomala 1978).

Subsistence activities include hunting and gathering with several families joining together at a campsite to gather, process, and cache vegetal foods. Seasonal rounds followed ripening plants from the valleys to the mountains. During different

seasons, agave, mesquite, cactus fruits, buds and blossoms, seeds, wild fruit, acorns, and piñon nuts were gathered. Deer, snakes, and birds were hunted, but rodents provided most of the meat in the Kumeyaay diet. Insects and larvae were also consumed. Trade of acorns, agave, mesquite, and gourds for salt, dried seaweed and other greens, and abalone shells was common with the northwestern neighboring Ipai. Limited floodplain agriculture was practiced along riverbanks (Apple *et al* 1994; Luomala 1978).

The Kumeyaay lifestyle began to change with the establishment of the San Diego Mission in 1769. Within a decade, the mission had converted almost 1,500 Kumeyaay and Ipai to Catholicism and introduced agriculture to them as a way of life. Secularization of the missions in the 1830s resulted in Kumeyaays becoming serfs on the large Mexican land grants given to new settlers. Others fled to the mountains and became fugitives. With American control of California, Kumeyaay served as laborers for ranches, mines, and towns. By 1968, 12 reservations had been established exclusively for Kumeyaay and Ipai members. Kumeyaay also resided on several other reservations shared by many groups. Population figures for Kumeyaay in 1770 were estimated at 3,000 but included only mission converts. In 1968, the Kumeyaay population numbered 1,322 (Luomala 1978).

History

In 1774, Captain Juan Bautista led the first expedition from Tubac, Sonora (near Tucson, Arizona), to Alta, California, and established the Anza trade route. In 1781, the Quechan Indians attacked and destroyed Spanish settlements located at the Yuma River crossing on the Colorado River. As a result, the Spanish abandoned this transportation route (Apple *et al.* 1994).

The Anza trail was reestablished during the war between the United States and Mexico. Shortly before the Treaty of Guadalupe-Hidalgo ended the war in 1848, gold was discovered in California. During the next few years, gold rush miners used the trail as an overland route. In 1859, Fort Yuma was established along the Colorado River at the route crossing below the Gila River confluence (Apple *et al.* 1994).

In 1900, investors in the California Development Company formed the Imperial Land Company to survey and develop lands to attract settlers. During the next few years, the Imperial Land Company established townsites for Imperial, Brawley, Calexico, Hever, and Silsbee. The Southern Pacific Railroad constructed a spurline from their transcontinental line at Niland south through the valley to Calexico. Soon after, the Imperial Valley experienced rapid development. In May 1901, the California Development Company opened the first irrigation canal into the valley area. By 1907, the valley had grown to the point that the citizens formed Imperial County from the eastern half of San Diego County (Apple *et al.* 1994). As a result of the construction of Boulder Dam and the All-American Canal which supplied water, Imperial Valley received increasing recognition as a agricultural center in the 1930s and 1940s (Apple *et al.* 1994).

Military facilities that were to become NAF El Centro were constructed near Seeley, California in 1942 and 1943 around the previously existing Civil Aeronautical Administration airfield (Apple *et al.* 1994). The facility served as a Marine Corps Air Station during World War II and was transferred to the Navy after the war. Through the years, NAF El Centro has been designated the Naval Air Facility, the Naval Auxiliary Landing Field, the Naval Air Station, the Naval Aerospace Recovery Facility, and the National Parachute Test Range (US Navy 1988a).

For 35 years NAF El Centro was involved in aeronautical escape system testing, evaluation, and design. The Naval Parachute Experimental Division began operations at NAF El Centro in 1947 and the Joint Parachute Facility was established in 1951. The United States Naval Aerospace Recovery Facility was established in 1964 and was combined with the Naval Air Facility in 1973 to form the National Parachute Test Range. All parachute test activities were transferred in 1979 to the Naval Air Weapons Center, China Lake and these operations ceased at NAF El Centro. Today, the primary function of NAF El Centro is to serve as a support facility for fleet air squadrons performing tactical air training, and to provide additional support to other DOD components (US Navy 1988a).

This page intentionally left blank.